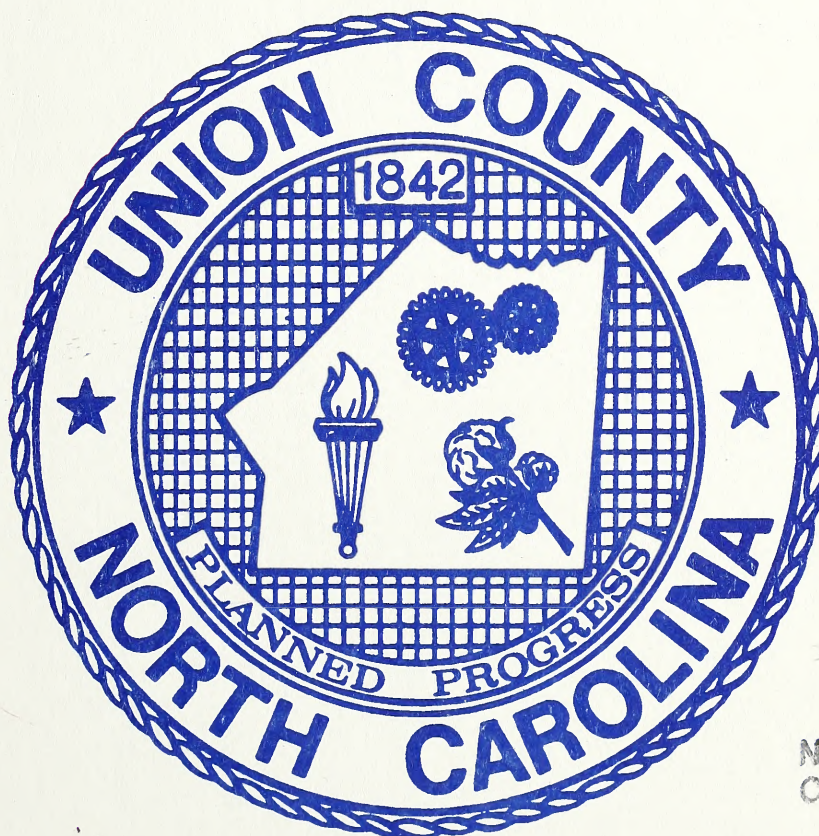


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North Carolina Department of Transportation
Statewide Planning Branch
Systems Planning Unit

Thoroughfare Plan for



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**THOROUGHFARE PLAN
FOR
UNION COUNTY, NORTH CAROLINA**

Prepared by the:

Statewide Planning Branch
Division of Highways
N. C. Department of Transportation

In cooperation with:

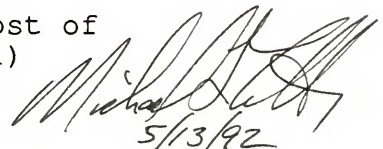
The County of Union
The Federal Highway Administration
U. S. Department of Transportation


April, 1992

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Chapter I

INTRODUCTION

Union County, located in the south-central Piedmont, is a significant element in the Charlotte Metro Region. Located only 20 miles southeast of Charlotte, Union County offers a quiet lifestyle with easy access to the Charlotte Regions entertainment, cultural, educational, and employment opportunities.

In addition to the opportunities provided by nearby Charlotte, Union County also offers many attractions. With average annual temperatures ranging from 77 degrees in the summer months, to 40 degrees in the winter months, Union County offers a moderate climate with gently rolling terrain. Union County boasts the largest county park in North Carolina, Cane Creek. This park offers bridle and hiking trails, camping, lake swimming, boating, bath house and rest rooms, snack bar, boat ramp and docks, picnic shelters, grills, playground, and a ball field.

Union County's educational system has always been innovative and progressive. It is home to one of the first high schools in the State to offer home economics, agriculture and music as a part of it's educational program. Union County is also home of Wingate College with an enrollment of approximately 1,800 students.

The formal establishment of Union County took place on December 19, 1842. Its name is a result of the union of Anson and Mecklenburg counties. Monroe, the county seat, was named for President James Monroe. Other municipalities in the county include Indian Trail, Marshville, Stallings, Unionville, Waxhaw, Weddington, and Wingate.

Union County, birthplace of President Andrew Jackson, was originally inhabited by the Waxhaw Indian tribe. The tribe was devastated by a smallpox epidemic in 1741. The ideal farmland in Union County attracted settlers from Pennsylvania, Germany, England, Wales, and Scotland who continued the agricultural tradition begun by the Waxhaw Indians. Today, Union County continues to be an agricultural leader in North Carolina being the top producer of turkeys and eggs. Other important agricultural products include soybeans, corn, milo, swine, broilers, beef and dairy products.

US 74 and US 601 transect the county and provide corridors into Mecklenburg, Anson, and Cabarrus Counties. Other major highways in Union County are NC 75, NC 16, NC 84, NC 200, NC 205, NC 207, NC 218, and NC 522. Rail service is provided by CSX, and general air service is available at Monroe Municipal Airport. Commercial air service is available in Mecklenburg County at Charlotte/Douglas International Airport.

Union County, with it's central location, offers an excellent environment for growth and continues to pursue social and economic change and improvement. Mecklenburg County continues to grow and be a large factor in the development of the western portion of Union County. The continued growth of Union County will be enhanced by the continued efforts to protect and improve the transportation system in this area.

Chapter II

COUNTY THOROUGHFARE PLANNING PRINCIPLES

There are many advantages to thoroughfare planning, but the primary mission is to assure that the road system will be progressively developed to serve future travel desires. The main consideration in thoroughfare planning is to make provisions so when the need arises, feasible opportunities to make improvements exist.

Benefits of Thoroughfare Planning

There are two major benefits derived from thoroughfare planning. First, each road or highway can be designed to perform a specific function and provide a specific level of service. This permits savings in right-of-way, construction, and maintenance costs. It also protects residential neighborhoods and encourages stability in travel and land use patterns. Second, local officials are informed of future improvements and can incorporate them into planning and policy decisions. This will permit developers to design subdivisions in a non-conflicting manner, direct school and park officials to better locate their facilities, and minimize the damage to property values and community appearance that is sometimes associated with roadway improvements.

County Thoroughfare Planning Concepts

The underlying notion of the thoroughfare plan is to provide a functional system of streets, roads, and highways that permit direct, efficient, and safe travel. Different elements in the system are designed to have specific functions and levels of service, thus minimizing the traffic and land service conflict.

In the county plan, elements are either urban or rural. In the urban planning area, the local municipality generally has planning jurisdiction. Outside the urban planning area, the county has planning jurisdiction. In those urban areas where no urban thoroughfare plan exists, elements are rural and are under the planning jurisdiction of the county.

Within the urban and rural systems, plan elements are classified according to the specific function they are to perform. A discussion of the elements and functions of the two systems follows.

Thoroughfare Classification Systems

Streets perform two primary functions, traffic service and land access, which when combined, are incompatible. The conflict is not serious if both traffic and land service demands are low. When traffic volumes are high, conflicts created by uncontrolled and intensely developed abutting property lead to intolerable traffic flow friction and congestion.

The idea of the thoroughfare plan is that it provides a functional system of streets that permit travel from origins to destinations with directness, ease and safety. Different streets in this system are to perform specific functions, thus minimizing the traffic and land service conflict.

A. Urban Classification

In the urban thoroughfare plan, elements are classified as major thoroughfares, minor thoroughfares, or local access streets.

Major Thoroughfares are the primary traffic arteries of the urban area providing for traffic movements within, around, and through the area.

Minor Thoroughfares collect traffic from the local access streets and carry it to the major thoroughfare system.

Local Access Streets provide access to abutting property. They may be further classified as either residential, commercial and/or industrial depending upon the type of land use that they serve.

Due to the limited amount of detail that can be shown on a county thoroughfare plan, only urban major thoroughfares are shown.

The coordinated system of major thoroughfares that is most adaptable to the desired lines of travel within an urban area is the radial-loop system. The radial-loop system includes radials, crosstowns, loops, and bypasses. Radial thoroughfares provide for travel from points outside to major destinations inside the urban area. Crosstown thoroughfares provide for traffic movement across the central area and around the central business district (CBD). Loop thoroughfares provide for lateral travel movements between suburban areas. Bypasses carry non-local traffic around and through the area. Occasionally, a bypass with low through traffic volumes can be designed to function as a portion of the urban loop. Figure 1 illustrates the idea of the radial-loop major thoroughfare system and the functionally classified urban street system.

IDEALIZED THOROUGHFARE PLAN

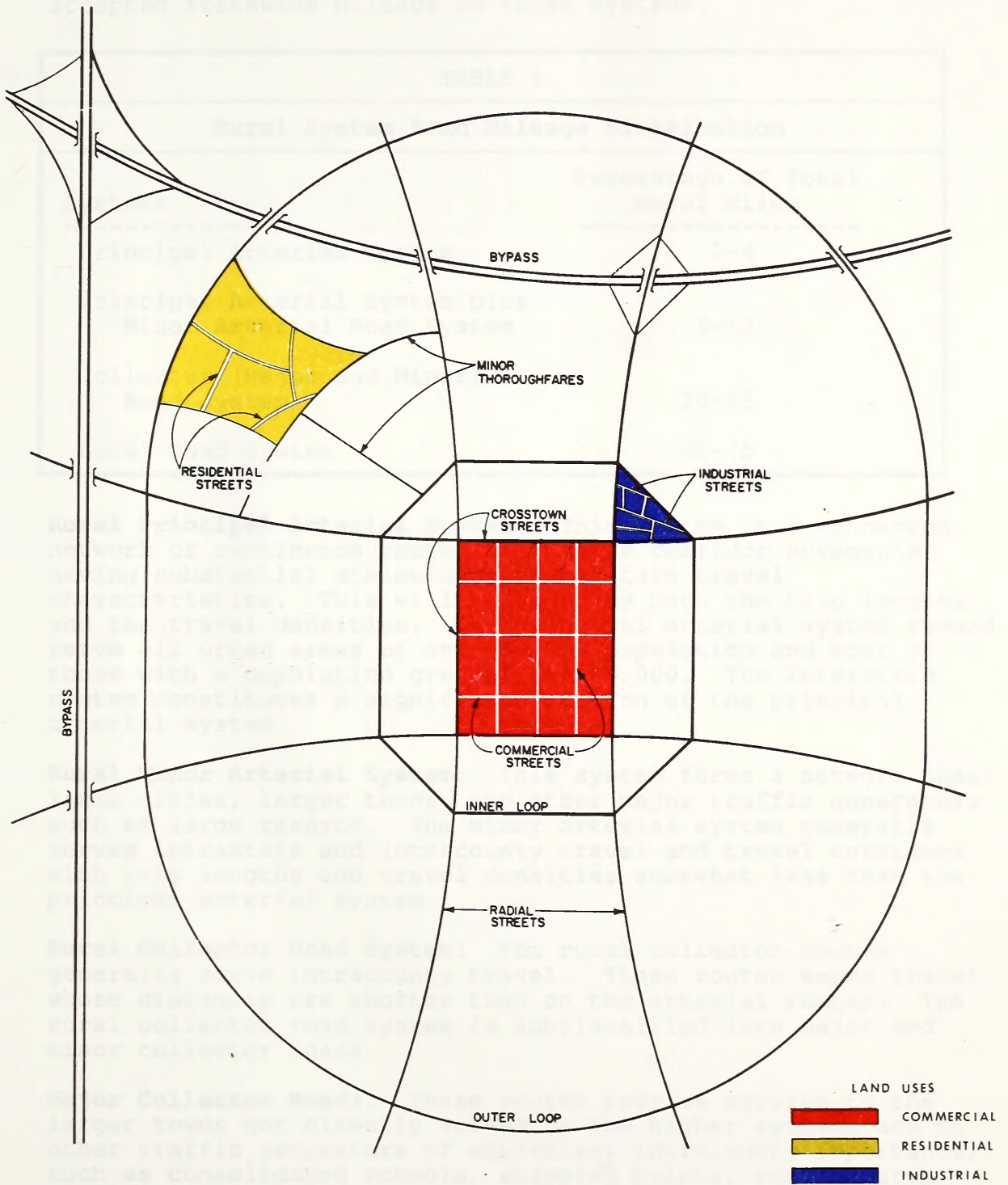


FIGURE 1

B. Rural Classification

The facilities outside the urban thoroughfare planning boundaries make up the rural system. There are four major systems: principal arterials, minor arterials, major and minor collectors, and local roads. Table 1 shows the generally accepted statewide mileage on these systems.

TABLE 1	
Rural System Road Mileage Distribution	
Systems -----	Percentage of Total Rural Miles -----
Principal Arterial System	2-4
Principal Arterial System plus Minor Arterial Road System	6-12
Collector (Major and Minor) Road System	20-25
Local Road System	65-75

Rural Principal Arterial System: This system is a connected network of continuous routes that serve corridor movements having substantial statewide or interstate travel characteristics. This will be shown by both the trip lengths and the travel densities. The principal arterial system should serve all urban areas of over 50,000 population and most of those with a population greater than 5,000. The Interstate system constitutes a significant portion of the principal arterial system.

Rural Minor Arterial System: This system forms a network that links cities, larger towns, and other major traffic generators such as large resorts. The minor arterial system generally serves intrastate and intercounty travel and travel corridors with trip lengths and travel densities somewhat less than the principal arterial system.

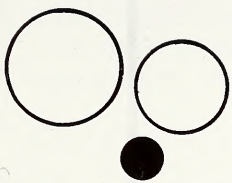
Rural Collector Road System: The rural collector routes generally serve intracounty travel. These routes serve travel whose distances are shorter than on the arterial routes. The rural collector road system is subclassified into major and minor collector roads.

Major Collector Roads: These routes provide service to the larger towns not directly served by the higher systems and to other traffic generators of equivalent intracounty importance, such as consolidated schools, shipping points, county parks, significant mining and agricultural areas, etc. Major collector roads also link these places to routes of higher classification and serve the more important intracounty travel corridors.

Minor Collector Roads: These routes (1) collect traffic from local roads and bring all developed areas within a reasonable distance of a major collector road; (2) provide service to the remaining smaller communities; and (3) link the locally important traffic generators with the rural outskirts.

Rural Local Road System: The local roads are all roads that are not on a higher system. Local residential subdivision streets and residential collector streets are elements of the local road system. Local residential streets are either cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than one mile in length. They do not connect thoroughfares or serve major traffic generators and do not collect traffic from more than one hundred dwelling units. Residential collectors serve as the connecting street system between local residential streets and the thoroughfare system.

Figure 2 gives a schematic illustration of a functionally classified rural highway system. The functional classification for Union County is shown in Figure 3.



LEGEND

CITIES AND TOWNS

VILLAGE



PRINCIPAL ARTERIALS



MINOR ARTERIALS



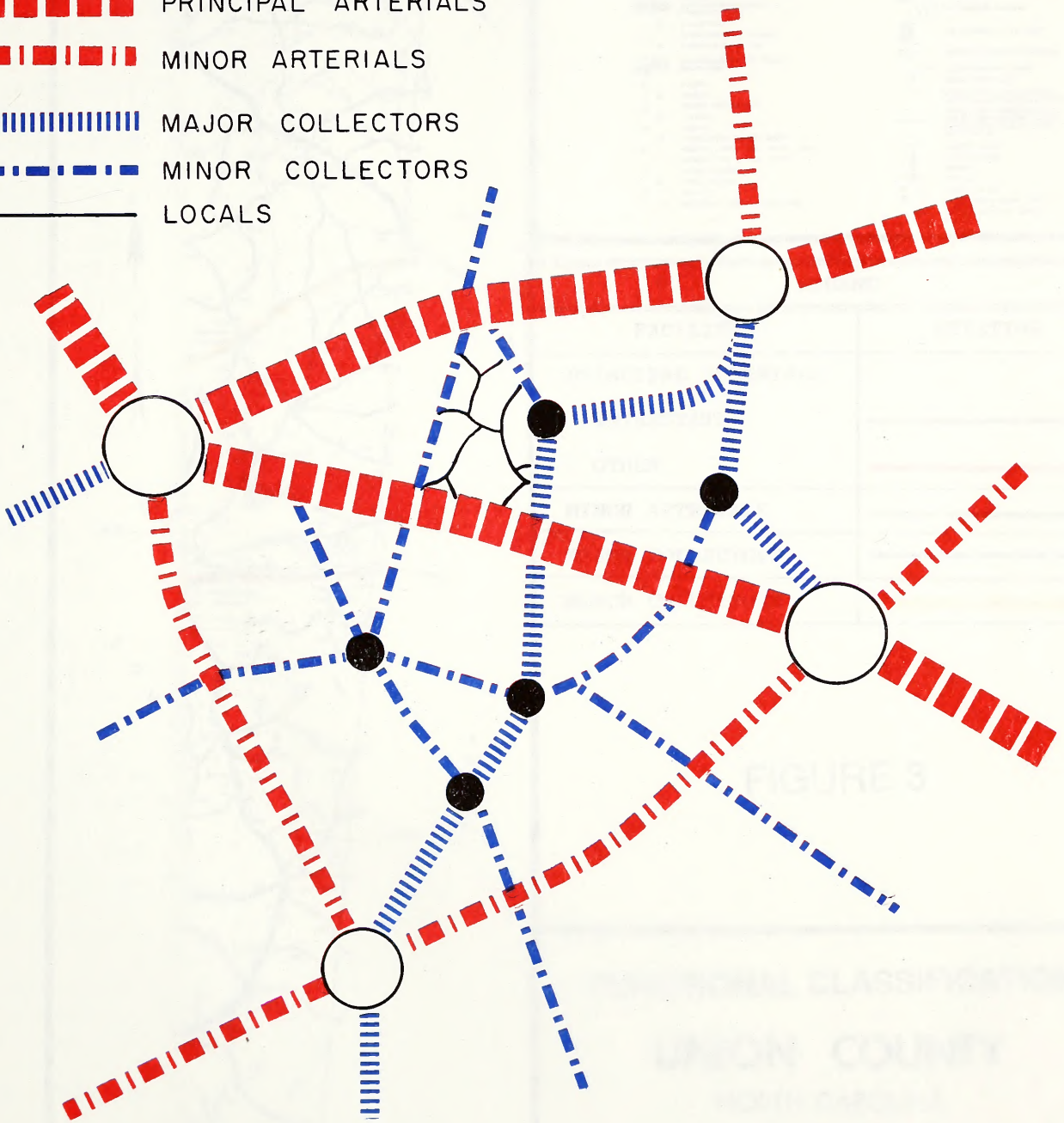
MAJOR COLLECTORS



MINOR COLLECTORS

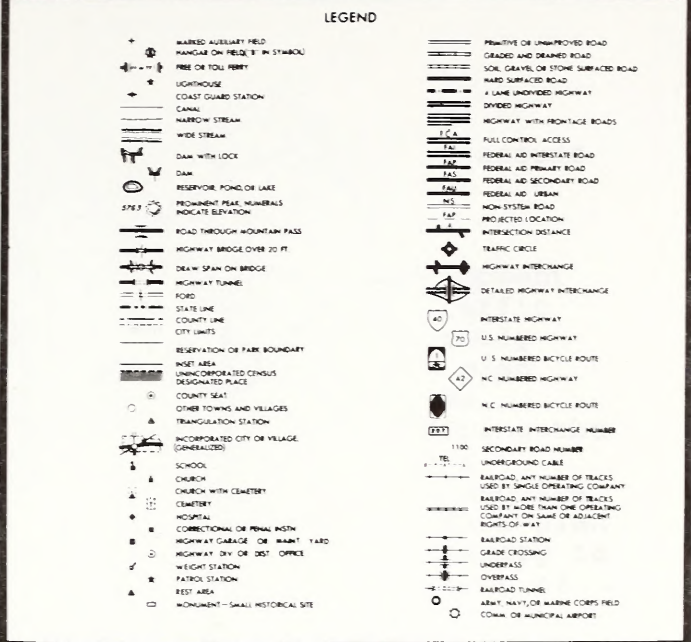
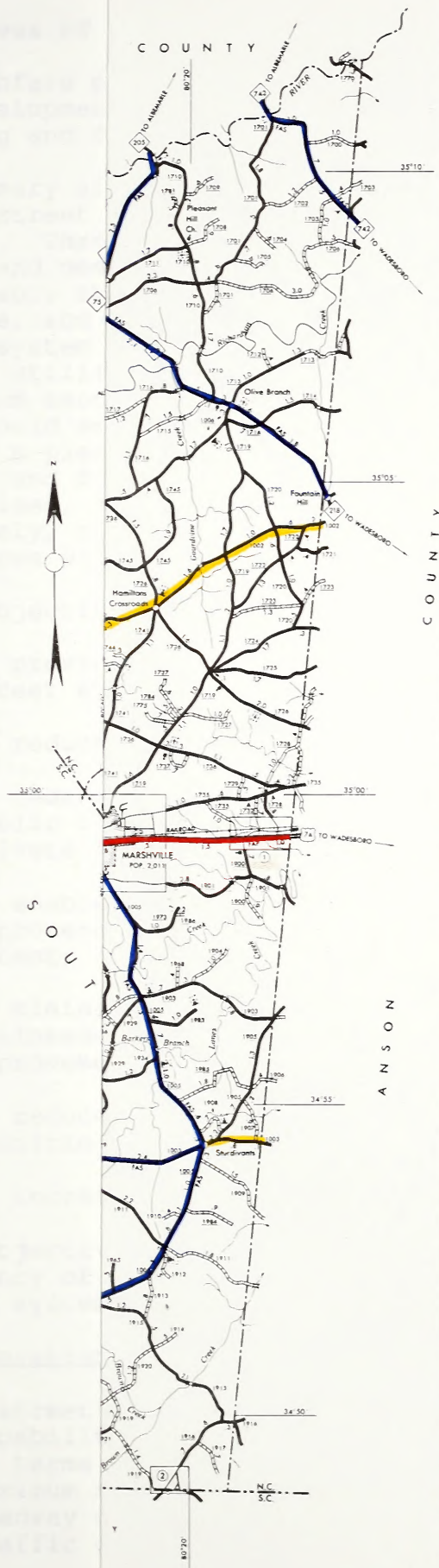


LOCALS



SCHEMATIC ILLUSTRATION
OF FUNCTIONALLY CLASSIFIED
RURAL HIGHWAY NETWORK

FIGURE 2

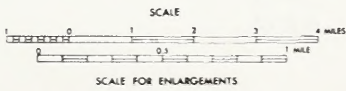


LEGEND	
FACILITY	EXISTING
PRINCIPAL ARTERIALS	
INTERSTATE	
OTHER	
MINOR ARTERIALS	
MAJOR COLLECTORS	
MINOR COLLECTORS	

FIGURE 3

FUNCTIONAL CLASSIFICATION UNION COUNTY NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION



Objectives of Thoroughfare Planning

Thoroughfare planning is the process public officials use to assure the development of the most appropriate street system to meet the existing and future travel desires within the urban area.

The primary aim of a thoroughfare plan is to guide the development of the street system in a manner consistent with changing traffic demands. Through proper planning for street development, costly errors and needless expense can be averted. A thoroughfare plan will enable street improvements to be made as traffic demands increase, and eliminate unnecessary improvements. By developing the street system to keep pace with increasing traffic demands, a maximum utilization of the system can be attained that will require a minimum amount of land for street purposes. The thoroughfare plan also should embody those details of good urban planning necessary to present a pleasing and efficient urban community. The location of present and future population, commercial and industrial enterprises, affects major street and highway locations. Conversely, the location of major streets and highways within the urban area will influence the urban development pattern.

Other objectives of a thoroughfare plan include:

- To provide for the systematic development of an adequate major street system as land development occurs;
- To reduce travel and transportation costs;
- To reduce the cost of major street improvements to the public through the coordination of street system with private action;
- To enable private interests to plan their actions, improvements, and development with full knowledge of public intent;
- To minimize disruption and displacement of people and businesses through long range planning for major street improvements;
- To reduce environmental impacts such as air pollution, resulting from transportation; and
- To increase travel safety.

These objectives can be achieved by improving both the operational efficiency of thoroughfares, and improving the system efficiency through system coordination and layout.

A. Operational Efficiency

A street's operational efficiency improves by increasing the capability of the street to carry vehicular traffic and people. In terms of vehicular traffic, a street's capacity is the maximum number of vehicles that can pass a given point on a roadway during a given time under prevailing roadway and traffic conditions. The physical features of the roadway,

nature of traffic, and weather also affect capacity.

Physical ways to improve vehicular capacity include:

Street widening - widening a street from two to four travel lanes more than doubles the capacity by providing additional maneuverability for traffic.

Intersection improvements - increasing the turning radii, adding exclusive turn lanes, and channelizing movements can improve the capacity of an existing intersection.

Improving vertical and horizontal alignment - reduces the congestion caused by slow moving vehicles.

Eliminating roadside obstacles - reduces side friction and improves a driver's field of sight.

Operational ways to improve street capacity include:

Control of access - A roadway with complete access control can often carry three times the traffic handled by a non-controlled access street with identical lane width and number.

Parking removal - Increases capacity by providing additional street width for traffic flow and reducing friction to flow caused by parking and unparking vehicles.

One-way operation - The capacity of a street can sometimes be increased 20-50%, depending upon turning movements and street width, by initiating one-way traffic operations. One-way streets also can improve traffic flow by decreasing potential traffic conflicts and simplifying traffic signal coordination.

Reversible lanes - Reversible traffic lanes may be used to increase street capacity in situations where heavy directional flows occur during peak periods.

Signal phasing and coordination - Uncoordinated signals and poor signal phasing restrict traffic flow by creating excessive stop-and-go operation.

Altering travel demand is a third way to improve the efficiency of existing streets.

Travel demand can be reduced or altered in the following ways:

Carpools - Encourage people to form carpools and vanpools for journeys to work and other trip purposes. This reduces the number of vehicles on the roadway and raises the people carrying capability of the street system.

Alternative mode - Encourage the use of other modes of travel such as transit and bicycles.

Work hours - Encourage industries, business, and institutions to stagger work hours or establish variable work hours for employees. This will reduce travel demand in peak periods and

spread peak travel over a longer time period.

Land use - Plan and encourage land use development or redevelopment in a more travel efficient manner.

B. System Efficiency

Another means of altering travel demand is the development of a more efficient system of streets that will better serve travel desires. A more efficient system can reduce travel distances, time, and cost. Improvements in system efficiency can be achieved through the concept of functional classification of streets and development of a coordinated major street system.

Application of Thoroughfare Planning Principles

The concepts presented in the discussion of operational efficiency, system efficiency, functional classification, and idealized major thoroughfare system are the conceptual tools available to the transportation planner in developing a thoroughfare plan. In actual practice, thoroughfare planning is done for established urban areas and is constrained by existing land use and street patterns, existing public attitudes and goals, and current expectations of future land use. Compromises must be made because of these and the many other factors that affect major street locations.

Throughout the thoroughfare planning process it is necessary from a practical viewpoint that certain basic principles be followed as closely as possible. These principles are as follows:

1. The plan should be derived from a thorough knowledge of today's travel - its component parts, as well as the factors that contribute to it, limit it, and modify it.
2. Traffic demands must be sufficient to warrant the designation and development of each major street. The thoroughfare plan should be designed to accommodate a large portion of all major traffic movements on a relatively few streets.
3. The plan should conform to and provide for the land development plan of the area.
4. Certain considerations must be given to urban development beyond the current planning period. Particularly in outlying or sparsely developed areas which have development potential, it is necessary to designate thoroughfares on a long-range planning basis to protect rights of way for future thoroughfare development.
5. While being consistent with the above principles and realistic in terms of travel trends, the plan must be economically feasible.

Chapter III

URBAN THOROUGHFARE PLANS IN UNION COUNTY

Thoroughfare plans are a tool to aid officials in the development of an appropriate street system. It is important that the communities and the county cooperate as a team in the development of this plan. Plan development and implementation as a team effort will help to ensure the development of an efficient system for travel throughout the county.

A thoroughfare plan was developed for the City of Monroe in 1980. This plan was mutually adopted by the City and the Department of Transportation in 1980. Union County adopted the Monroe Thoroughfare Plan in 1983.

High priority was given to the following projects in Monroe:

1. Roosevelt Boulevard (US 74)
2. Lancaster Avenue
3. Walkup Avenue
4. Windsor Street
5. Charles Street
6. Fincer Street-Sutherland Street Connector
7. Sunset Drive-Johnson Street Connector
8. Sutherland Street

For further details and other plan considerations, refer to the Monroe Thoroughfare Plan Report, 1978, and the Monroe Plan Supplement 1981, North Carolina Department of Transportation.

Thoroughfare Plan studies are currently underway for the following areas:

1. Weddington-Stallings-Indian Trail
2. Waxhaw
3. Marshville
4. Wingate

Projects currently in the Transportation Improvement Program, 1991-1997, for Monroe and Union County are:

1. US 74, Monroe Bypass - four lane divided freeway on new location. (R-2559)
2. US 601, from US 74 to South Carolina State Line - widen existing roadway to a multi-lane section. (R-2616)
3. Rea Road, from Marvin-Weddington Road to the proposed Charlotte Outer Loop - multi-lane and two lane construction on new location. (U-2506)
4. NC 16 (Old Providence Road), from NC 84 to existing four lanes -widen existing roadway to a four lane facility. (U-2510)

5. Charlotte Avenue, from the railroad to Concord Avenue - widen existing two lane roadway to a multi-lane facility. (U-213)
6. SR 2188 (Charles Street), from SR 2181 to SR 2110 - widen existing roadway to a multi-lane facility. (U-2547)
7. Monroe Northern Loop, US 74 to SR 1751 at SR 1763 - two lane facility on four lane right-of-way. (U-2549)

Chapter IV

POPULATION, LAND USE, AND TRAFFIC

The objective of thoroughfare planning is to develop a system of transport that will enable people and goods to travel safely and economically. To decide the needs of a county, the factors of population, land use, and traffic must be examined. It is important to understand the type and amount of travel that takes place in the area to plan for transportation needs. It is also necessary to identify the goals and objectives to be met by the thoroughfare plan.

To fulfill the objectives of an adequate 20-year thoroughfare plan, reliable forecasts of future travel characteristics must be made. The following major items to be considered are: (1) historical and potential population changes; (2) significant trends in the economy; (3) the character and intensity of land development; and (4) motor vehicle registration and use. The effects of legal controls such as zoning ordinances and subdivision regulations, availability of public utilities and transportation facilities, and topographic and other physical features of the area also must be considered.

Population Trends

The volume of traffic on a section of roadway is a function of the size and location of the population it serves. Analysis of the population is the first step for a transportation planner. The analysis of past trends allows the planner to estimate future population and the traffic that it will generate with some degree of reliability.

Since 1940, the population of Union County has grown steadily. The largest growth occurred between 1970 and 1980 with a 28.6% increase. Table 2 shows historical and projected population trends for the County by decade.

The growth in Union County, by Township is shown in Table 3. This table denotes that Vance township and Sandy Ridge townships have experienced the largest increase in growth over the past twenty years. This increase is due largely to the influence of Charlotte and Mecklenburg County. As the City of Charlotte has grown into the southeastern region of Mecklenburg County, people have migrated to Union County for housing alternatives and lower tax rates.

During the same period, Marshville township and Lanes Creek township experienced slow growth. This population growth can be attributed to geographical location. The pattern suggests several factors for the out-migration. They are (1) the absence of an urban place for attracting industrial development; (2) inadequate transportation linkages; (3) a shortage of skilled labor; and (4) declining farm labor needs.

TABLE 2		
Historical and Projected Population Union County		
<u>YEAR</u>	<u>POPULATION</u>	<u>% CHANGE</u>
1940	39,097	-
1950	42,034	7.5%
1960	44,670	6.3%
1970	54,714	22.5%
1980	70,436	28.7%
1990	84,211	19.6%
2000	102,416	21.6%
2010	118,148	15.4%
2020		

TABLE 3						
Growth of Union County, by Township 1940 - 1990						
	1940	1950	1960	1970	1980	1990
Buford	4,213	4,329	3,690	5,107	6,365	7,688
Goose Creek	4,096	4,195	4,577	5,317	7,054	8,167
Jackson	2,581	2,761	2,358	3,276	4,507	5,851
Lanes Creek	2,055	1,649	1,495	1,388	1,266	1,475
Marshville	4,442	5,785	5,232	5,746	6,768	6,587
Monroe	14,127	15,203	18,334	23,258	26,261	30,291
New Salem	2,522	2,340	2,176	1,746	2,025	2,324
Sandy Ridge	2,860	3,048	2,953	2,940	4,744	8,564
Vance	2,201	2,724	3,855	5,936	11,390	13,264

Land Use

The generation of traffic on a particular street is very closely related to the use of adjacent land areas. Some types of land use generate much more traffic than others. For example, a commercial or retail area such as a shopping center will generate (or attract) much larger volumes of traffic than a residential area. The attraction between different land uses varies with the intensity of development and the distance between those developed areas. Therefore, it becomes necessary to designate land uses by type for transportation planning. An analysis of the distribution of existing land uses serves as a basis for forecasting future land use needs and the resulting travel patterns.

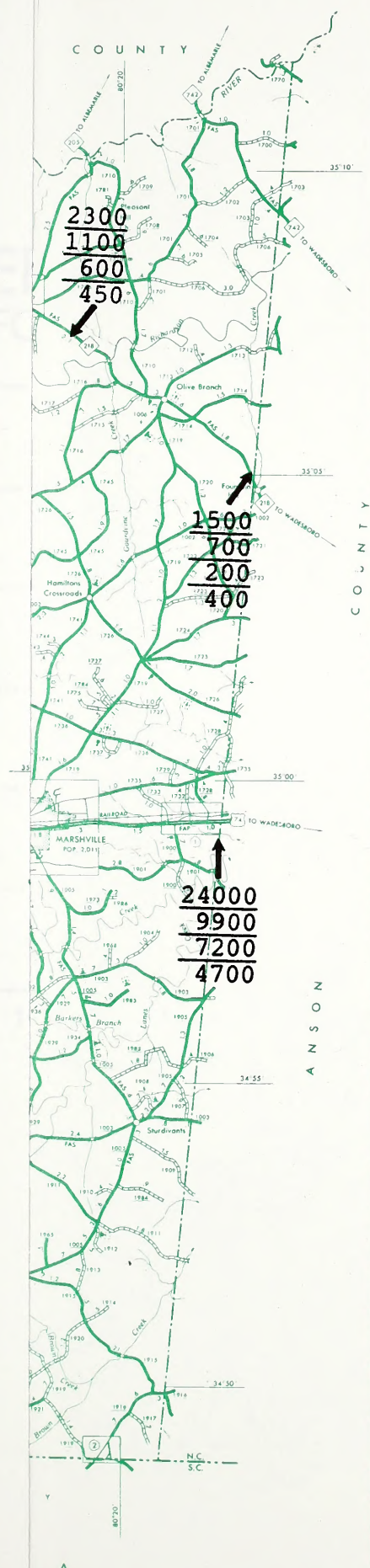
Land use in Union County centers mainly around agriculture. The exception to this is the US 74 corridor and the townships along the Mecklenburg County line. US 74 is bounded primarily by commercial and industrial development. With the influence of Charlotte as a major employment center, land use in the townships bordering Mecklenburg County reflect mainly residential development. There are no major retail traffic generators in Union County outside of the City of Monroe.

Traffic

A comparison of 1970, 1980, and 1990 average annual daily traffic volumes (ADT) on selected major roads and highways in Union County is shown in Figure 4. Also shown are projections for the year 2020, assuming no changes to the existing street system are made. These projections were based on historical and anticipated population and economic growth patterns and land use trends.

Vehicle registration has increased at a much greater rate than population since 1940. This increase can be shown best by a graph depicting the change in persons per vehicle ratio over time. This ratio is obtained by dividing the total population of the area by the total number of vehicles registered in that area. Figure 5 shows this comparison for North Carolina and Union County and includes projections to the year 2020. The results illustrate the transition from a non-automobile oriented society to one whose vitality is heavily dependent on the automobile. This change in lifestyle has gradually occurred over many years, with the most dramatic difference being between 1940 and 1960. This is primarily due to: (1) the post-depression increase in the standard of living; (2) the increase in population including the post World War II "Baby Boom"; (3) the transition from an agriculturally dominated society to a more diversified one (fewer people on the farm, greater need for transportation); and (4) the availability of automobiles in the 1960's and 1970's and the banking credit to buy them.

Since the 1970's, though, these reasons for purchasing more automobiles have had less influence and have led to the expectation that the person-per-vehicle rate will begin to stabilize as projected in Figure 5. This saturation effect is expected to stabilize trip-making characteristics of middle and upper income families since they already have the financial means to purchase enough vehicles to satisfy their transportation needs. On the other hand, moderate growth in the trip-making characteristics of lower income families is projected due to an expected improvement in their financial well-being.



HISTORIC AND PROJECTED ADT VOLUMES

FIGURE 4

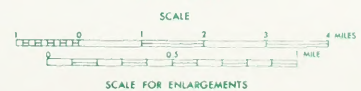
LEGEND

2020 ADT
1990 ADT
1980 ADT
1970 ADT

UNION COUNTY NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH
IN COOPERATION WITH THE
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

JAN. 1990



LEGEND

- MARKED AUXILIARY FIELD
- HANGAR ON FELD, 8' IN SYMBOL
- PIER OR FILL PIER
- LIGHTHOUSE
- COAST GUARD STATION
- CANAL
- NARROW STREAM
- WIDE STREAM
- DAM WITH LOCK
- DAM
- RESERVOIR, POND, OR LAKE
- PROMINENT PEAK, NUMERALS INDICATE ELEVATION
- ROAD THROUGH MOUNTAIN PASS
- HIGHWAY BRIDGE OVER 30 FT
- DRAW SPAN ON BRIDGE
- HIGHWAY TUNNEL
- FORD
- STATE LINE
- COUNTY LINE
- CITY LIMITS
- RESERVATION OR PARK BOUNDARY
- INSET AREA
- UNINCORPORATED CENSUS DESIGNATED PLACE
- COUNTY SEAT
- OTHER TOWNS AND VILLAGES
- TRIANGULATION STATION
- INCORPORATED CITY OR VILLAGE (GENERALIZED)
- SCHOOL
- CHURCH
- CHURCH WITH CEMETERY
- CEMETERY
- HOSPITAL
- CORRECTIONAL OR PENAL INSTITUTION
- HIGHWAY GARAGE OR MAINT. YARD
- HIGHWAY DIV. OR DIST. OFFICE
- PATROL STATION
- REST AREA
- MONUMENT—SMALL HISTORICAL SITE
- PRIMITIVE OR UNIMPROVED ROAD
- GRADED AND DRAINED ROAD
- SURFACE
- GRAVEL OR STONE SURFACED ROAD
- HARD SURFACED ROAD
- A LAKE UNDIVIDED HIGHWAY
- DIVIDED HIGHWAY
- HIGHWAY WITH FRONTAGE ROADS
- FULL CONTROL ACCESS
- FEDERAL AID INTERSTATE ROAD
- FEDERAL AID PRIMARY ROAD
- FEDERAL AID SECONDARY ROAD
- FEDERAL AID URBAN
- HIGHWAY SYSTEM ROAD
- PROJECTED LOCATION
- INTERSECTION DISTANCE
- TRAFFIC CIRCLE
- HIGHWAY INTERCHANGE
- DETAILED HIGHWAY INTERCHANGE
- INTERSTATE HIGHWAY
- U. S. NUMBERED HIGHWAY
- U. S. NUMBERED BICYCLE ROUTE
- N. C. NUMBERED HIGHWAY
- N. C. NUMBERED BICYCLE ROUTE
- INTERSTATE INTERCHANGE NUMBER
- SECONDARY ROAD NUMBER
- UNDERGROUND CABLE
- RAILROAD, ANY NUMBER OF TRACKS USED BY SINGLE OPERATING COMPANY
- RAILROAD, ANY NUMBER OF TRACKS USED BY MORE THAN ONE OPERATING COMPANY ON LAKE OR ADJACENT RIGHTS OF WAY
- RAILROAD STATION
- GRADE CROSSING
- UNDERPASS
- OVERPASS
- RAILROAD TUNNEL
- ARMY, NAVY, OR MARINE CORPS FIELD
- CIVIL OR MUNICIPAL AIRPORT

PERSONS PER VEHICLE TRENDS FOR NORTH CAROLINA AND UNION COUNTY

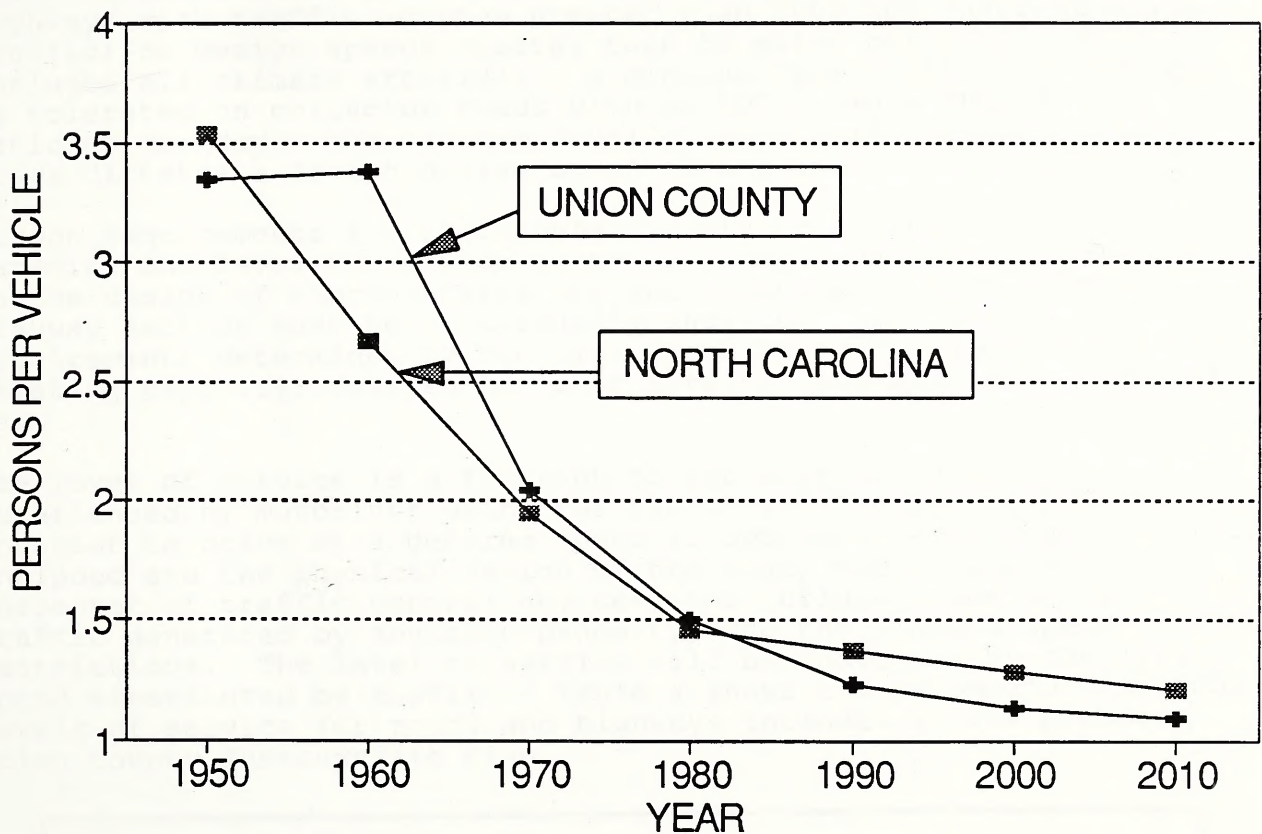


FIGURE 5

Chapter V

EXISTING CONDITIONS

To assess the needs of a transportation network, it is essential that the general characteristics of the existing system must be analyzed. These characteristics include design, roadway safety, and structural elements. Any deficiencies in these areas should be reduced or eliminated, to provide the most efficient transportation system possible.

Capacity, Width, and Alignment Deficiencies

North Carolina's design standards call for 11 foot lanes on all highways with traffic volumes greater than 2000 ADT (average daily traffic) or design speeds greater than 50 miles per hour. This includes all primary arterials. A minimum lane width of 9 feet can be tolerated on collector roads with an ADT of less than 400 vehicles per day. The minimum level of service for minor collector roads dictates a 40 mph design speed during peak traffic conditions.

Design requirements for thoroughfares vary according to the desired capacity and level of service to be provided. Universal standards in the design of thoroughfares are not practical. Each road or highway section must be individually analyzed. Its design requirements determined by the amount and type of projected traffic, existing capacity, desired level of service, and available right of way.

The level of service is a function of the ease of movement experienced by motorists using the facility. The ability of a motorist to drive at a desired speed is dependent upon many factors. Included are the physical design of the road, the amount and character of traffic control devices, the influence and character of traffic generated by abutting property, and the imposed speed restrictions. The level of service will be indicated by the travel speed experienced by traffic. Table 4 shows the recommended minimum levels of service for roads and highways included in the proposed Union County Thoroughfare Plan.

TABLE 4	
Minimum Levels of Service for Roads and Highways	
Facility	Travel Speed During Peak Travel Conditions
Major and Minor Arterials	50-55 MPH
Major Collector Roads	45-50 MPH
Minor Collector Roads	40 MPH

For driver convenience, ease of operations, and safety, it would be desirable to widen all existing roads and highways to provide a minimum lane width of 12 feet. When considering statewide needs and the available highway revenue, these levels of improvement applied statewide would be impractical. Therefore, it is necessary to

establish minimum tolerable widths for existing roads with respect to traffic demands that would be economically feasible. The widths used to define the existing lane deficiencies in the County are given in Table 5.

TABLE 5			
Minimum Tolerable Lane Widths (in feet)			
<u>ADT</u>	<u>Principal Arterials</u>	<u>Minor Arterials</u>	<u>Collectors</u>
over 2,000	11	11	11
400 - 2,000	-	10	10
100 - 400	-	10	9
below 100	-	-	9

An analysis of roads in Union County was made to determine if the projected traffic (year 2020) would exceed the practical capacity of the system. The projected volumes are in Figure 4. Comparing the projected traffic to available capacities, the following roads will be experiencing capacity related problems within the design period:

1. US 74, from WCL Wingate to Mecklenburg County
2. US 601, from SCL Monroe to SC Line
3. NC 16, from NC 75 to Mecklenburg County
4. NC 75, from ECL Waxhaw to WCL Monroe
5. NC 200, from NC 218 to NC 522
6. SR 1007, from US 74 to NC 200
7. SR 1008, SCL Indian Trail to US 74
8. SR 1009, NCL Monroe to Mecklenburg County
9. SR 1377, SR 1162 to SR 1353
10. SR 1501, NCL Monroe to Mecklenburg County

There are several major roads in the County that have substandard widths. The standards established in Table 4 were used in the analysis. The width needed to bring these roads up to standard are given as the recommended cross section in the Thoroughfare Plan Street Tabulation and Recommendations in Appendix A. Because of the substantial cost of upgrading all secondary roads to standard, narrow widths may have to be tolerated until sufficient funds are available for improvements.

Traffic Safety

Traffic accident records are of assistance in locating problem areas on the highway system. The Intersection Accident Listing for the period from January 1988 to January 1991, lists ten intersections in Union County with 15 or more accidents during the three-year study period. Those intersections or those whose accident severity or property damage is considerably higher than the average, are significant high accident locations. Listed below in Table 6 are the ten highest accident locations in the County.

TABLE 6	
Traffic Accident Records	
US 74 / SR 1008	46
NC 84 / SR 1007	33
US 74 / SR 1007	25
US 74 / SR 1365	25
US 74 / SR 1377	23
SR 1524 / SR 1582	23
SR 1008 / SR 1009	19
SR 1009 / SR 1377	17
NC 75 / SR 1007	15
SR 1008 / SR 1367	15

Bridge Conditions

Bridges are a vital and unique element of a highway system. First, they represent the highest unit investment elements of the system. Second, any inadequacy or deficiency in a bridge reduces the value of the total investment. Third, a bridge presents the greatest opportunity for potential highway failures. Finally, and most importantly, a bridge represents the greatest opportunity for loss of life. For these reasons, it is imperative for bridges to be constructed to the same design standards as the rest of the system.

Congress enacted the National Bridge Inspection Program Standards on April 27, 1971, implementing the Federal Highway Act of 1968. These standards require that "all structures defined as bridges located on any of the Federal-Aid Highway Systems are to be inspected. The safe load carrying capacity also must be computed at regular intervals, not to exceed two years." A sufficiency index number is calculated for each bridge to establish eligibility and priority for replacement. The bridges with the highest priority are to be replaced as Federal-Aid funds and State funds are available.

The North Carolina DOT's Bridge Maintenance Unit, with assistance from various consultants, inspects all bridges on the State Highway System. All bridges in Union County have been analyzed, rated, appraised, and inventoried. The resulting data has been reduced to a more readily useable form as a management tool.

A sufficiency rating was used in the analysis to determine the deficiency of each bridge. The sufficiency rating is a method of evaluating factors that determine whether a bridge is sufficient to remain in service. Factors used include: structural adequacy and safety, serviceability and functional obsolescence, essentiality for public use, type of structure, and traffic safety features. The result of this method is a percentage in which 100 percent represents an entirely sufficient bridge. Zero percent represents an entirely insufficient or deficient bridge. A sufficiency rating of 50 percent or less qualifies for Federal Bridge Replacement Funds. Table 7 shows structurally deficient bridges with sufficiency ratings of 100 percent or less. Only those bridges with ratings of 50 percent or less are eligible for federal bridge

replacement funds. The locations of these bridges are shown in Figure 6.

Table 8 shows the functionally obsolete bridges in Union County that have sufficiency ratings of 50 percent or less. Those bridges with a star by their Map Index number are included in the current Transportation Improvement Program. Their locations are shown in Figure 7. These bridges are also eligible for federal bridge replacement funds.

Listed below are the bridges that are included in the current Transportation Improvement Program:

- SR 1104 over Waxhaw Creek (Bridge # 178)
- SR 1117 over Cane Creek (# 173)
- SR 1162 over Twelve Mile Creek (#'s 208 and 240)
- SR 1346 over Twelve Mile Creek (# 233)
- SR 1367 over S. Fork Crooked Creek (# 254)
- SR 1501 over S. Fork Crooked Creek (# 248)
- SR 1547 over Duck Creek (# 3)
- SR 1627 over Chinkapin Creek and Lake Twiddy (# 20)
- SR 1630 over Richardson Creek (# 26)
- SR 1901 over Lanes Creek (# 288)
- SR 1937 over Beaverdam Creek (# 94)
- SR 1963 over Rays Fork Creek (# 361)
- SR 2102 over Richardson Creek (# 147)

TABLE 7

Structurally Deficient Bridges in Union County

Map Index	Suff. Rating	Bridge No.	Location
* 1	37.4	003	SR 1547 @ Duck Creek
2	37.3	005	SR 1600 @ Clear Creek
3	44.9	017	SR 1504 @ Stumplick Branch
* 4	17.6	020	SR 1627 @ Chinkapin Creek
* 5	43.2	026	SR 1630 @ Richardson Creek
6	30.3	036	SR 1649 @ Brandon Creek
7	40.1	037	SR 1658 @ Gold Branch
8	47.8	044	SR 1706 @ Br. of Richardson Cr.
9	41.1	046	SR 1716 @ Gourd Vine Creek
10	37.7	050	SR 1719 @ Smith Creek
11	25.8	055	SR 1741 @ Salem Creek
12	22.7	084	SR 1962 @ Flag Branch
13	28.1	092	SR 1903 @ Beaverdam Creek
*14	24.0	094	SR 1937 @ Beaverdam Creek
15	45.1	095	SR 1948 @ Beaverdam Creek
16	46.9	099	SR 1902 @ Beaverdam Creek
17	25.8	106	SR 1003 @ Cool Spring Branch
18	47.3	118	SR 1937 @ Lanes Creek
19	47.3	136	SR 2118 @ Lanes Creek
20	42.2	144	SR 2115 @ Little Richardson Cr.

TABLE 7 (Cont.)

Structurally Deficient Bridges in Union County

Map Index	Suff. Rating	Bridge No.	Location
*21	31.1	147	SR 2102 @ Richardson Creek
22	28.5	149	SR 2115 @ Branch of Lake Monroe
23	18.7	166	SR 1137 @ Cane Creek
24	27.0	167	SR 1131 @ Cane Creek
25	47.4	168	SR 1128 @ Cane Creek
*26	27.8	178	SR 1104 @ Waxhaw Creek
27	40.5	184	SR 1113 @ Waxhaw Creek
28	42.2	188	SR 1137 @ Waxhaw Creek
29	48.0	198	SR 1147 @ Twelve Mile Creek
30	43.5	201	SR 1149 @ Twelve Mile Creek
31	31.9	205	SR 1157 @ Beaverdam Creek
*32	19.4	208	SR 1162 @ Twelve Mile Creek
33	22.9	211	SR 1162 @ E. Fork Twelve Mile Cr.
34	49.6	217	SR 1327 @ Bates Branch
35	45.6	219	SR 1008 @ Creek
36	38.1	221	SR 1315 @ W. Fork Twelve Mile Cr.
37	47.2	222	SR 1315 @ Muddy's Run
38	32.4	223	SR 1321 @ W. Fork Twelve Mile Cr.
*39	33.5	233	SR 1346 @ Twelve Mile Creek
*40	31.5	240	SR 1162 @ Twelve Mile Creek
*41	35.7	248	SR 1501 @ S. Fork Crooked Creek
42	14.9	250	SR 1515 @ S. Fork Crooked Creek
43	28.5	258	SR 1008 @ S. Fork Crooked Creek
44	37.3	265	SR 1525 @ Goose Creek
45	18.9	267	SR 1520 @ N. Fork Crooked Creek
46	42.2	269	SR 1004 @ S. Fork Crooked Creek
47	12.7	276	SR 1525 @ Duck Creek
48	35.9	285	SR 2153 @ Lynches Creek
49	32.3	287	SR 1901 @ Lick Branch
*50	13.2	288	SR 1901 @ Lanes Creek
51	43.2	309	SR 1902 @ Branch of Beaverdam Cr.
52	31.4	326	SR 1505 @ Stumplick Branch
53	40.5	357	SR 1662 @ Crisco Branch
*54	17.6	361	SR 1963 @ Ray's Fork Creek
55	43.7	377	SR 1103 @ Waxhaw Creek
56	37.3	444	SR 1506 @ E. Fork Stewarts Cr.
57	44.7	449	SR 1900 @ Lick Branch

TABLE 8

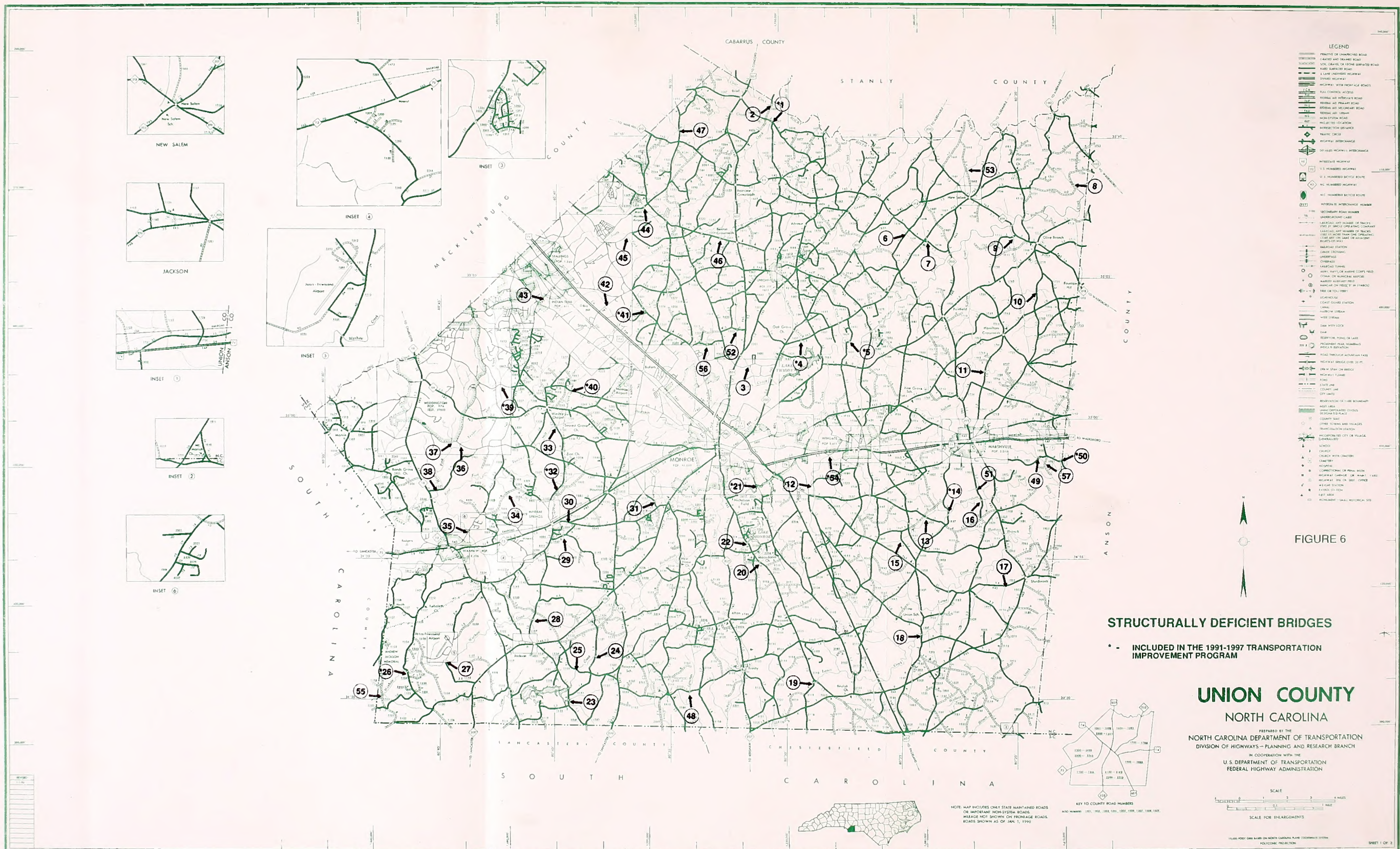
Functionally Obsolete Bridges in Union County

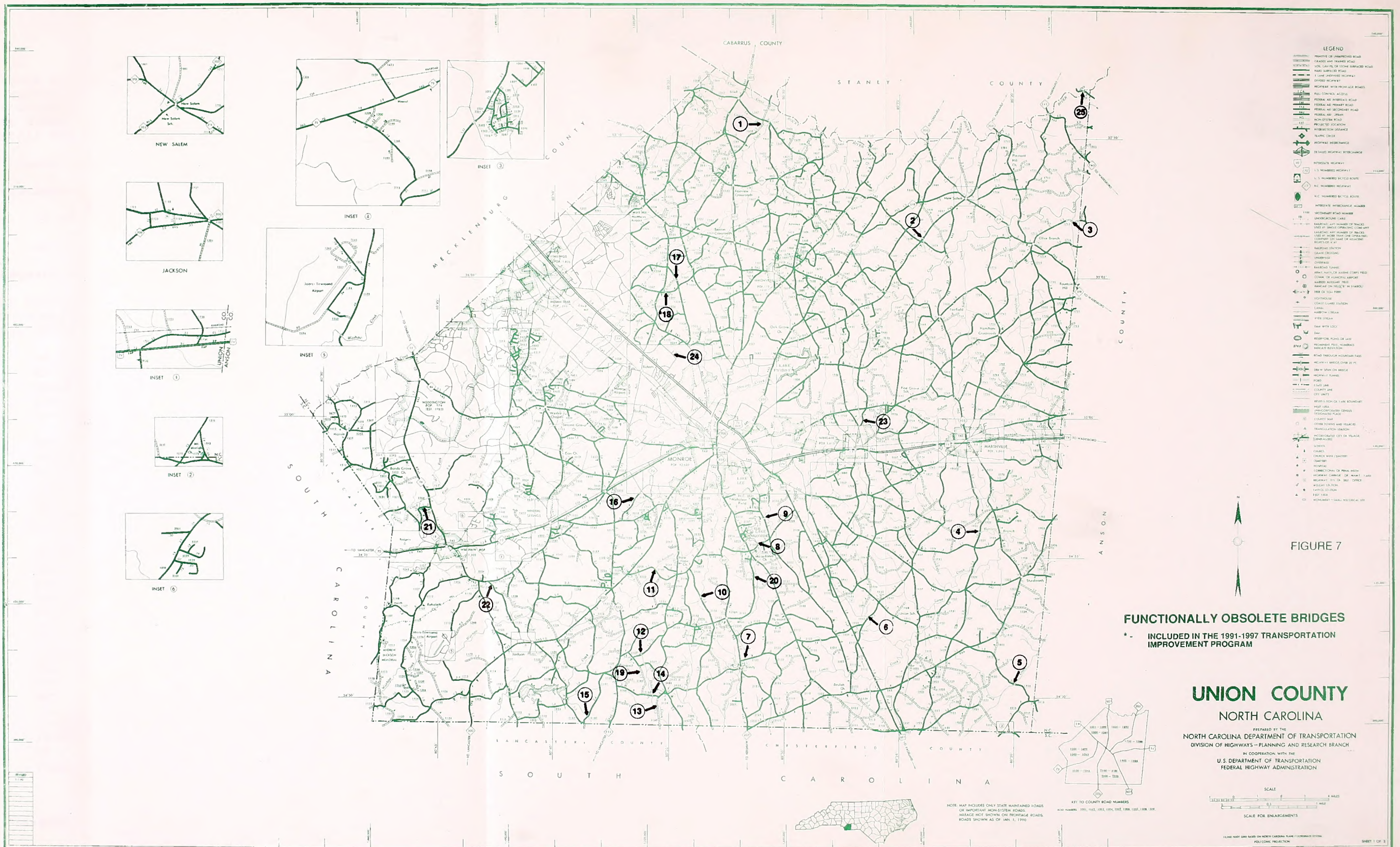
Map Index	Suff. Rating	Bridge No.	Location
1	40.2	006	SR 1600 @ Duck Creek
2	49.0	035	SR 1627 @ Gold Branch
3	41.6	047	SR 1713 @ Water Branch
4	43.1	098	SR 1929 @ Barker's Branch
5	48.2	109	SR 1915 @ Brown Creek
6	47.1	122	SR 1940 @ Wicker Creek
7	38.2	139	SR 2125 @ Branch of Buffalo Cr.
8	40.2	145	SR 2106 @ Little Richardson Cr.
9	49.9	146	SR 2102 @ Buck Branch
10	43.0	152	SR 2156 @ Adams Branch
11	49.7	156	SR 2139 @ Richardson Creek
12	39.2	157	SR 2170 @ Pole Cat Creek
13	46.4	160	SR 2146 @ Pole Cat Creek
14	47.6	163	SR 2166 @ Pole Cat Creek
15	39.3	165	SR 1130 @ Creek
16	39.3	204	SR 1158 @ Beaver Dam Creek
17	35.3	251	SR 1508 @ S. Fork Crooked Creek
*18	43.7	254	SR 1367 @ S. Fork Crooked Creek
19	42.8	347	SR 2168 @ Branch of Pole Cat Cr.
20	34.2	356	SR 2133 @ Little Richardson Cr.
21	47.8	359	SR 1304 @ Branch of Twelve Mi Cr.
22	43.1	376	SR 1126 @ Branch of Waxhaw Creek
23	47.3	429	SR 1631 @ Meadow Branch
24	48.2	446	SR 1510 @ Stewarts Creek
25	47.7	450	SR 1770 @ Rocky River

TABLE 8

Functionally Obsolete Bridges in Union County

Map Index	Suff. Rating	Bridge No.	Location
1	40.2	006	SR 1600 @ Duck Creek
2	49.0	035	SR 1627 @ Gold Branch
3	41.6	047	SR 1713 @ Water Branch
4	43.1	098	SR 1929 @ Barker's Branch
5	48.2	109	SR 1915 @ Brown Creek
6	47.1	122	SR 1940 @ Wicker Creek
7	38.2	139	SR 2125 @ Branch of Buffalo Cr.
8	40.2	145	SR 2106 @ Little Richardson Cr.
9	49.9	146	SR 2102 @ Buck Branch
10	43.0	152	SR 2156 @ Adams Branch
11	49.7	156	SR 2139 @ Richardson Creek
12	39.2	157	SR 2170 @ Pole Cat Creek
13	46.4	160	SR 2146 @ Pole Cat Creek
14	47.6	163	SR 2166 @ Pole Cat Creek
15	39.3	165	SR 1130 @ Creek
16	39.3	204	SR 1158 @ Beaver Dam Creek
17	35.3	251	SR 1508 @ S. Fork Crooked Creek
*18	43.7	254	SR 1367 @ S. Fork Crooked Creek
19	42.8	347	SR 2168 @ Branch of Pole Cat Cr.
20	34.2	356	SR 2133 @ Little Richardson Cr.
21	47.8	359	SR 1304 @ Branch of Twelve Mi Cr.
22	43.1	376	SR 1126 @ Branch of Waxhaw Creek
23	47.3	429	SR 1631 @ Meadow Branch
24	48.2	446	SR 1510 @ Stewarts Creek
25	47.7	450	SR 1770 @ Rocky River





Chapter VI

UNION COUNTY THOROUGHFARE PLAN

Figure 8 shows the recommended thoroughfare plan for Union County. Elements of the plan are classified as urban or rural. Only major thoroughfares classified as either freeway or other are shown within the urban planning area. This is necessary due to the limited detail that can be shown on the map.

Elements of the Union County Plan are as follows:

Principal Arterials

US 74

US 601 - From Monroe to South Carolina Line

Suggestions for Principal Arterials

The following project is being requested in addition to the US 74 Bypass (R-2559) and US 601 widening (R-2616) requested in the 1992-98 Transportation Improvement Program.

US 74 Bypass Extension - US 74 is part of North Carolina's Intrastate System. The primary purpose of this roadway is the movement of regional traffic from the port of Wilmington to Charlotte, the State's largest city. Due to the nature of this corridor, its traffic carrying ability should be protected.

The US 74 corridor in Union County is densely developed resulting in many driveways and signalized intersections. Driveways and intersections are points of conflict for traffic flow. This conflict increases the level of congestion experienced by roadway users. In addition to increasing congestion, driveways introduce a danger and a hindrance to traffic flow.

To protect the importance of US 74, a Monroe Bypass has been included in the 1991 Transportation Improvement Program. Tentative plans indicate that this Bypass will connect with existing US 74 near the Bakers community. The section of US 74 between Bakers and the proposed Charlotte Outer Loop currently carries average traffic volumes of approximately 33,000 vehicles per day. Traffic projections indicate that this number could reach 78,000 vehicles per day by the year 2020. This roadway is not designed to handle this level of traffic. The result will be an increase in congestion, driving hazards, and delay.

To provide US 74 roadway users a safer and more efficient route from western to eastern North Carolina, it is recommended that US 74 be upgraded from the planned US 74 Bypass to the Charlotte Outer Loop.¹

¹ Feasibility report

US 601 (From Monroe to South Carolina Line) - US 601 is a major north/south route providing a link between Monroe, North Carolina and Lancaster, South Carolina. This roadway serves primarily as a through route carrying high volumes of truck traffic. To provide a higher level of service and enhance the safety along US 601, this roadway has been scheduled for widening in the 1991 Transportation Improvement Program. (R-2616)

Collector Road System

The rural collector routes, consisting of major and minor collectors, serve primarily intracounty travel. The major collector roads supplement the arterial system by providing an interconnecting network between smaller population centers and the arterial system. The minor collector roads collect traffic from the local roads and carry it to a higher system facility. Major and minor collector roads of Union County are as follows:

Major Collectors:

1. US 601: Monroe to Cabarrus Co. Line
2. NC 16: NC 75 to Weddington Planning Boundary
3. NC 75: Monroe Planning Boundary to SC Line
4. NC 84: Monroe Planning Boundary to NC 16
5. NC 200: SC Line to Stanly Co.
6. NC 205: US 74 to Stanly Co.
7. NC 207: SC Line to Monroe Planning Boundary
8. NC 218: Anson Co. to Mecklenburg Co.
9. NC 522: SC Line to NC 200
10. NC 742: Anson Co. to Stanly Co.
11. Love Mill Road (SR 1001): SR 1637 to US 601
12. White Store Road (SR 1003): SR 1005 to US 601
13. Landsford Road (SR 1005): US 601 to US 74
14. Rocky River Road (SR 1007): NC 200 to US 74
15. Waxhaw/Indian Trail (SR 1008): Waxhaw to US 74
16. Old Charlotte Hwy. (SR 1009): Monroe Planning Boundary to Mecklenburg Co.
17. Providence Road (SR 1111): SR 1117 to NC 75
18. Providence Road (SR 1117): NC 200 to SR 1111
19. Unionville/Indian Trail (Sardis Church Road) (SR 1367): Unionville to US 74
20. Secrest Shortcut Road (SR 1501): Monroe Planning Boundary to Mecklenburg Co.
21. Old Camden Road (SR 1606): SR 1618 to Stanly Co.
22. Tom Helms Road (SR 1618): SR 1606 to Unionville
23. New Salem Road (SR 1627): NC 205 to NC 200
24. McIntyre Road (SR 1631): US 74 to NC 200
25. Lawyers Road (SR 1637): NC 200 to SR 1001
26. Austin Grove Church Road (SR 1751): NC 205 to Monroe Planning Boundary

Minor Collectors:

1. Ansonville Road (SR 1002): Anson Co. to US 74
2. White Store Road (SR 1003): Anson Co. to SR 1005
3. Lawyers Road (SR 1004): US 601 to Mecklenburg Co.
4. Landsford Road (SR 1005): SC Line to US 601

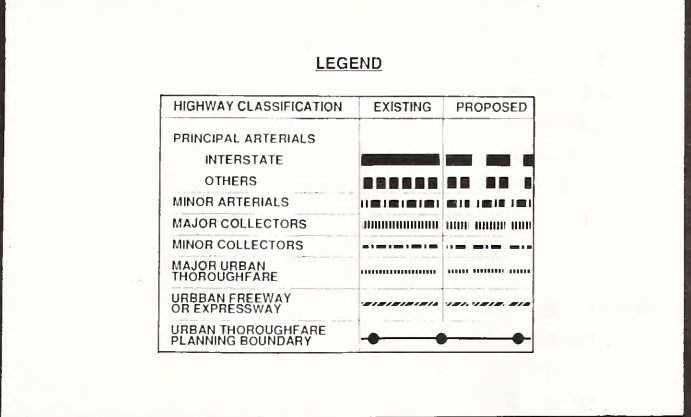
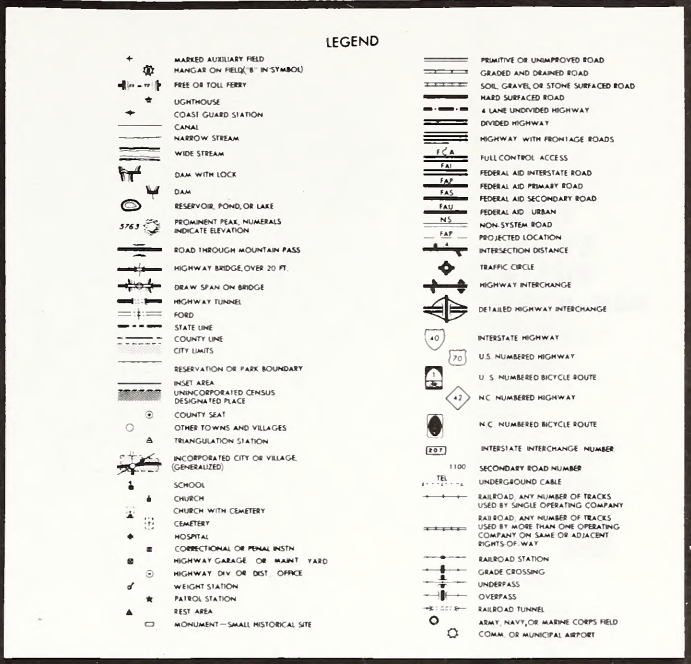
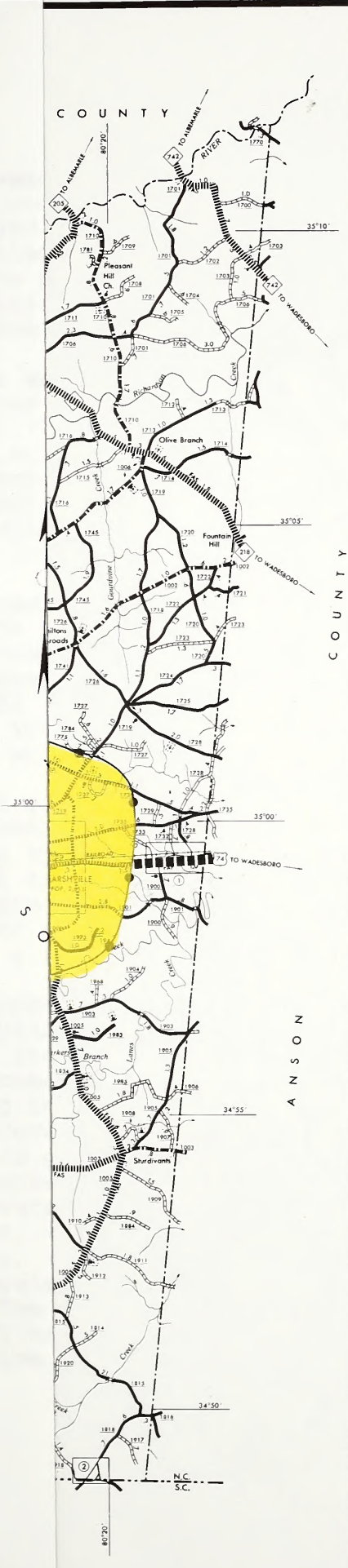
5. Olive Branch Road (SR 1006): NC 205 to NC 200
6. Providence Road (SR 1111): SR 1117 to NC 75
7. Providence Road (SR 1117): SC Line to NC 200
8. Potter Road (SR 1137): SC Line to NC 200
9. Potter Road (SR 1162): NC 75 to NC 84
10. New Town Road (SR 1315): SR 1007 to SC Line
11. Wesley Chapel/Stouts Road (SR 1377): NC 84 to US 74
12. Rocky River Road (SR 1514): US 74 to SR 1004
13. Old Camden Road (SR 1606): NC 200 to SR 1001
14. Old Highway 74 (SR 1740): US 74 to US 74
15. Whitmore Road (SR 1758): SR 1957 to US 74
16. Old Pageland/Marshville (SR 1937): SR 1003 to SR 1740
17. Old Monroe/Marshville (SR 1957): SR 1740 to SR 1003
18. Medlin Road (SR 2102): SR 2106 to Monroe Planning Boundary
19. Macedonia Church Road (SR 2106): US 601 to SR 2115
20. Stacks Road (SR 2115): SR 2136 to NC 207
21. Griffith Road (SR 2139): NC 200 to Monroe Planning Boundary
22. Plyler Mill/Gus Eubanks (SR 2146): SR 2164 to NC 200
23. Gus Eubanks Road (SR 2164): SC Line to SR 2146

Suggestions for the Collector Road System

Listed below are the suggested projects for the collector road system in Union County for the period from 1990-2020. These projects are being requested in addition to the NC 16 widening listed in the 1991 Transportation Improvement Program. (U-2510)

NC 16 - NC 16 serves as a connector between the densely populated residential communities of Weddington and Waxhaw in Union County, and the shopping and employment centers in the Charlotte region. Current traffic volumes along NC 16 in Union County range from 4,500 vehicles per day (vpd) near Waxhaw to 8,000 vpd near the Mecklenburg County line. With the continued growth and development along this corridor, traffic volumes are predicted to exceed 22,000 vpd before the year 2020. The 1991 Transportation Improvement Program includes the widening of NC 16 to four lanes from NC 84 to the existing four lane section in Mecklenburg County. To accommodate the future growth in this area, and to provide an alternate route into the Charlotte area, it is recommended that the section of NC 16 between the Weddington Planning Boundary and the Waxhaw Planning Boundary be widened to a four lane divided facility.

NC 75 - NC 75 is a major collector connecting the western communities in Union County with the City of Monroe. NC 75 connects SC 521, a four lane divided highway in South Carolina, with NC 16. This path provides an alternate route into Charlotte. The South Carolina Department of Highways and Public Transportation is currently conducting a preliminary engineering study for an extension of Dave Lyle Boulevard, (SC 122), across the Catawaba River. This extension will tie into US 521 at the intersection of SC 75. This roadway will provide better access between Lancaster County and York County in South Carolina, as well as provide an additional crossing for the Catawaba River. The construction of this roadway will provide access from I-77 in York County near Rock Hill to US 521 in Lancaster County and on to NC 16 in Union County.



ADOPTED BY:
UNION COUNTY _____

RECOMMENDED FOR APPROVAL BY:
STATEWIDE PLANNING BRANCH _____

ADOPTED BY:
DEPT. OF TRANSPORTATION _____

PUBLIC MEETING: _____

NOTE: YELLOW REGIONS DENOTE URBAN PLANNING AREAS

FIGURE 8

RECOMMENDED THOROUGHFARE PLAN UNION COUNTY NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-PLANNING AND ENVIROMENTAL BRANCH
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

FEBRUARY 3, 1992

SCALE

SCALE FOR ENLARGEMENTS

BASE: JANUARY 1990

Chapter VII

IMPROVEMENT PRIORITIES

The improvements to the Union County Thoroughfare Plan obviously cannot be undertaken all at once. The cost could be overwhelming and the need for some may not be immediate. An assessment of the benefits that can be expected from each project and a comparison was made to the projected costs involved. The result of this benefit-cost analysis is the development of a listing of priorities for those recommended improvements.

Priorities were set by comparing the benefits that will result to the expected project costs. Three principal measures of benefits were used: (1) road user cost savings, (2) the potential for increased economic development resulting from the improvement, and (3) the environmental impact, both positive and negative, which might result. The first measure is an actual estimate of dollar savings, while the others are estimates of the probability of the resulting change.

Reduced road user costs should result from any roadway improvement. Comparisons of the existing and the proposed facility were made in terms of vehicle operating costs, travel time costs, and accident costs. These user benefits are computed as total dollar savings over the 20 year design period using data such as project length, base year and design year traffic volumes, traffic speed, type of facility, and volume/capacity ratio.

The impact of a project on economic development potential is denoted as the probability that it will stimulate the economic development of an area by providing land access and reducing transportation costs. It is a subjective estimate based on the knowledge of the proposed project, local development characteristics, and land development potential. The probability is rated on a scale from 0 (none) to 1.00 (excellent).

The environmental impact analysis considers the effect of a project on the physical, social/cultural, and economic environment. Table 9 lists the items that are considered when evaluating the impact on the environment. Many of these have been accounted for in evaluating the project with respect to user benefits, cost, and economic development potential. However, thirteen environmental factors are generally not considered in these evaluations. They are the environmental impacts of a project on: (1) air quality, (2) water resources, (3) soils and geology, (4) wildlife, (5) vegetation, (6) neighborhoods, (7) noise, (8) educational facilities, (9) churches, (10) parks and recreational facilities, (11) historic sites and landmarks, and (12) public health and safety. The summation of both positive and negative impact probabilities with respect to these factors provides a measure of the relative environmental impact of a project.

TABLE 9
Environmental Considerations
<u>Physical Environment</u> Air quality Water Resources Soils and Geology Wildlife Vegetation
<u>Social and Cultural Environment</u> Housing Neighborhoods Noise Educational Facilities Churches Parks and Recreational Facilities Public Health and Safety National Defense Aesthetics
<u>Economic Environment</u> Businesses Employment Economic Development Public Utilities Transportation Costs Capital Costs Operation and Maintenance Costs

Offsetting the benefits that would be derived from any project is the cost of its construction. A new facility, despite its high projected benefits, might prove to be unjustified due to the excessive costs involved in construction. The highway costs estimated in this report are based on the average statewide construction costs for similar project types. An estimate of anticipated right-of-way costs is included. Table 10 evaluates the proposed Union County projects with respect to user benefits, estimated costs, probability of economic development, and environmental impact.

To guide both the State and the County in their efforts to implement the improvements recommended in this report, the proposed projects were placed into three priority groups in order of probable need. These priorities are shown in Table 11. Since conditions are constantly changing with time, these priorities should be periodically reevaluated by the County and the Division Engineer. Other roadway improvements, which can be identified from Appendix A, are considered to be low priority projects.

Environmental Concerns

NC 16 - The widening of NC 16 is not expected to result in any significant impact on the environment. There will be limited wetland involvement at the crossing of Twelve Mile Creek. Other impacts related to actual construction include minor erosion and siltation, and increased noise from construction machinery.

NC 75 - The widening of NC 75 from two lanes to four lanes may result in a significant impact to the environment. Several locations along NC 75 were identified as natural habitats for the schweinitz sunflower, a federally listed endangered plant species. Due to the type of environment conducive to the growth of the schweinitz sunflower, it is possible that this area can also be home to other species of environmental concern. Special care must be taken on this project to reduce the impact on the schweinitz sunflower. Possible mitigation of the impact could result if widening of NC 75 could take place on the opposite side of the schweinitz sunflower location.

Bridge Replacement Priorities

The deficient bridges shown in Table 12 were placed in three priority groups based on computer data and information supplied by the Bridge Maintenance Unit of the North Carolina Department of Transportation. Data such as the remaining life of the bridge, length, width, and sufficiency rating were used to determine these priorities.

TABLE 10

Benefits Evaluation of Selected Projects in Union County

PROJECT	LENGTH (MILES)	TOTAL BENEFIT (IN MILLIONS \$)	ECONOMIC		ENVIRONMENTAL IMPACT PROBABILITY
			DEVELOPMENT POTENTIAL PROBABILITY	ENVIRONMENTAL IMPACT PROBABILITY	
NC 16, from the Waxhaw Planning Boundary to the Weddington Planning Boundary	3.00	9.89 C 4.08 R 0.40	1.00	+ .20 - .15	
NC 75, from the Waxhaw Planning Boundary to the Monroe Planning Boundary	6.80	13.24 C 2.57 R 1.95	.40	+ .15 - .65	
NC 200 N, from Monroe Planning Boundary to NC 218	7.80	8.97 C 3.60 R 0.00	.40	+ .15 - .15	
NC 200 S, from NC 522 to the Monroe Planning Boundary	4.50	5.48 C 2.02 R 0.00	.40	+ .15 - .05	
Rocky River Road (SR 1007), from NC 200 to the Monroe Planning Boundary	6.00	10.26 C 2.70 R 0.00	.40	+ .15 - .10	

TABLE 11

Improvement Priorities and Cost Estimates

ROUTE AND SECTION	RECOMMENDATION	(Cost Estimates in \$ millions)		
		CONST.	R.O.W	TOTAL
FIRST PRIORITY: 1991 - 2010				
NC 16, from the Waxhaw Planning Boundary to the Weddington Planning Boundary	4 lanes divided	4.08	0.40	4.48
NC 200 S, from NC 522 to the Monroe Planning Boundary	2 lanes, rural	2.02	0.00	2.02
SECOND PRIORITY: 2010 - 2020				
NC 75, from the Waxhaw Planning Boundary to the Monroe Planning Boundary	4 lanes, rural	2.57	1.95	4.52
NC 200 N, from Monroe Planning Boundary to NC 218	2 lanes, rural	3.60	0.00	3.60
Rocky River Road (SR 1007), from NC 200 to the Monroe Planning Boundary	2 lanes, rural	2.70	0.00	2.70

TABLE 12

Improvement Priorities for Bridges in Union County

STRUCT. NO.	FACILITY CARRIED	FEATURES INTERSECTED	SUFF. EST. LIFE RATING	CODE	ADT	REPLACEMENT COST (\$1991)
FIRST						
PRIORITY:	276	SR 1525 Duck Creek	12.7	A	350	112,000
	250	SR 1515 S. Fork Crooked Creek	14.9	B	2,000	130,000
	166	SR 1137 Cane Creek	18.7	A	860	94,000
	267	SR 1520 N. Fork Crooked Creek	18.9	A	350	148,000
	84	SR 1962 Flag Branch	22.7	B	420	148,000
	211	SR 1162 W. Fork Twelve Mile Creek	22.9	B	1,500	328,000
SECOND						
PRIORITY:	55	SR 1741 Salem Creek	25.8	A	300	97,000
	167	SR 1131 Cane Creek	27.0	A	120	97,000
	106	SR 1003 Cool Spring Branch	25.8	B	300	94,000
	92	SR 1903 Beaverdam Creek	28.1	B	300	112,000
	258	SR 1008 S. Fork Crooked Creek	28.5	B	1,200	112,000
	149	SR 2115 Branch of Lake Monroe	28.5	B	2,400	86,000
THIRD						
PRIORITY:	36	SR 1649 Brandon Creek	30.3	A	180	72,000
	287	SR 1901 Lick Branch	32.3	A	450	133,000
	223	SR 1321 W. Fork Twelve Mile Creek	32.4	A	200	148,000
	50	SR 1719 Smith Creek	37.7	A	350	72,000
	444	SR 1506 E. Fork Stewarts Creek	37.3	A	100	112,000
	221	SR 1315 W. Fork Twelve Mile Creek	38.1	B	1,700	184,000

* Estimated Remaining Life Code:

A - 5 years or less

B - 6-10 years

C - 11-20 years

Chapter VIII

IMPLEMENTATION

There are several tools available for use by the County to aid in the implementation of a thoroughfare plan. They are as follows:

State-County Adoption of Thoroughfare Plan

If requested, the North Carolina Department of Transportation, in cooperation with the County, will develop and mutually approve a County Thoroughfare Plan. The mutually approved plan serves as a guide to the Department of Transportation in the development of the road and highway system for the County. The approval of the plan by the County will enable standard road regulations and land use controls to be used effectively in the implementation of this plan.

Subdivision Controls

The subdivision regulations require every subdivider to submit to the County planning commission a plan of the proposed subdivision. It also requires that the subdivision be constructed to certain standards. Through this process, it is possible to require the subdivision streets to conform to the thoroughfare plan and to reserve or protect necessary rights-of-way for projected roads and highways that are to become a part of the thoroughfare plan. The construction of subdivision streets to adequate standards would reduce maintenance costs and simplify the transfer of the streets to the State Highway System.

Land Use Controls

Land use regulations are an important tool in that they regulate future land development and minimize undesirable development along roads and highways. The land use regulatory system can improve highway safety by requiring sufficient setbacks to provide for adequate sight distances and by requiring off-street parking.

Funding

The majority of the improvements are scheduled and funded by the Transportation Improvement Program. The Board of Transportation regularly conducts public meetings to obtain input from the public pertaining to their needs for highway improvements.

Not all roadway improvements are covered by this procedure, though. Nearly all secondary road work is done on a county by county basis. These funds, known as the county construction account, are used to pave unimproved roads, widen roadways, stabilize dirt roads, make minor alignment improvements, and even construct short connectors when appropriate. The County Commissioners are encouraged to work with the Division Engineer when the County's priority list is developed. Many of the minor improvements recommended may be realized by using the County's construction account funds and developing the County's priority list in conjunction with the Division Engineer.

Appendix A

TYPICAL CROSS SECTIONS

Typical cross sections recommended by the Thoroughfare Planning Unit are shown in Appendix A, Figure A1, and listed in Appendix A, Table A1.

Cross section "A" is typical for controlled access freeways. The 46 foot grassed median is the minimum median width. Wider variations could result depending upon design considerations. Slopes of 8:1 into 3 foot drainage ditches are desirable for traffic safety. Right-of-way requirements would typically vary upward from 250 feet depending upon cut and fill requirements.

Cross section "B" is typical for four lane divided highways in rural areas that may have only partial or no control of access. The minimum median width for this cross section is 30 feet, but a wider median is desirable. Design requirements for slopes and drainage would be similar to cross section "A", but there may be some variation from this depending upon right-of-way constraints.

Cross section "C", three lane urban, and **cross section "D"**, five lane urban, are typical for major thoroughfares where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

Cross sections "E" and "F" are used on major thoroughfares where left turns and intersecting streets are not as frequent. Left turns would be restricted to a few selected intersections.

Cross section "G" is recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 24 feet is recommended with 30 feet being desirable.

Typical **cross section "H"** is recommended for major thoroughfares where projected travel indicates a need for four travel lanes, but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections.

Thoroughfares which are proposed to function as one-way traffic carriers would typically require **cross section "I"**.

Cross sections "J" and "K" are recommended for minor thoroughfares since these facilities usually serve both land service and traffic service functions. Cross section "J" would be used on those minor thoroughfares where parking on both sides is needed as a result of more concentrated development.

Cross section "L" is used in rural areas or for staged construction of a wider multilane cross section. On some thoroughfares, projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time.

The curb and gutter cross sections all illustrate the sidewalk next to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk farther away from the street to provide added separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

Rights-of-way shown for the typical cross sections are the minimum rights-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

If there is sufficient bicycle traffic along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to allow for the bicycle facilities. The North Carolina Bicycle Facility and Program Handbook should be consulted for bicycle facility design standards.

Recommended typical cross sections for thoroughfares were derived using projected traffic, existing capacities, desirable levels of service, and available right-of-way.

TYPICAL THOROUGHFARE CROSS SECTIONS

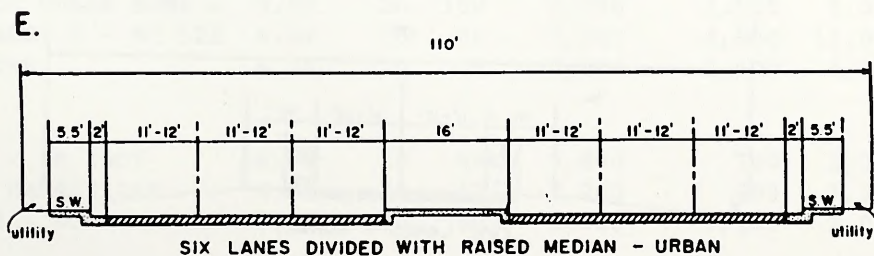
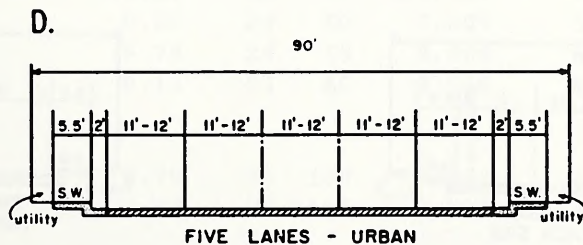
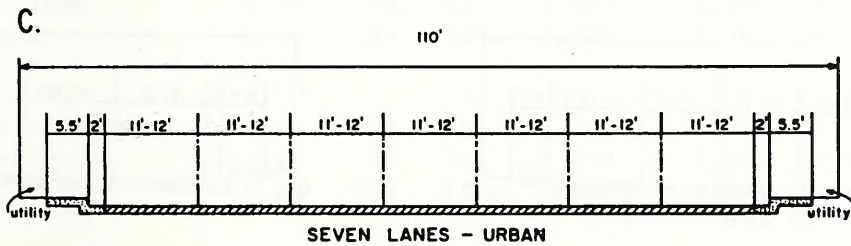
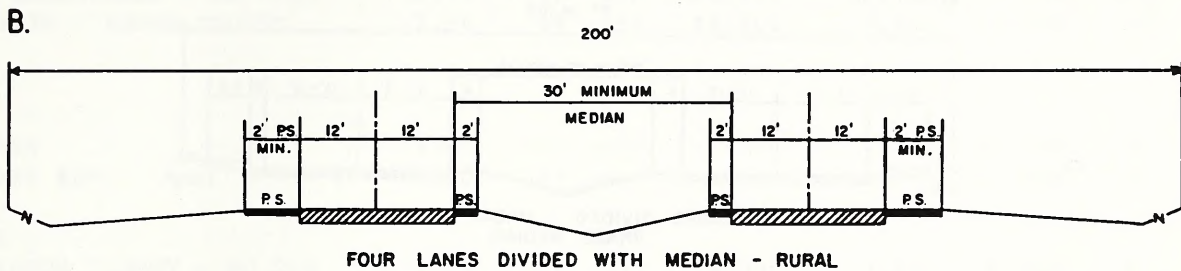
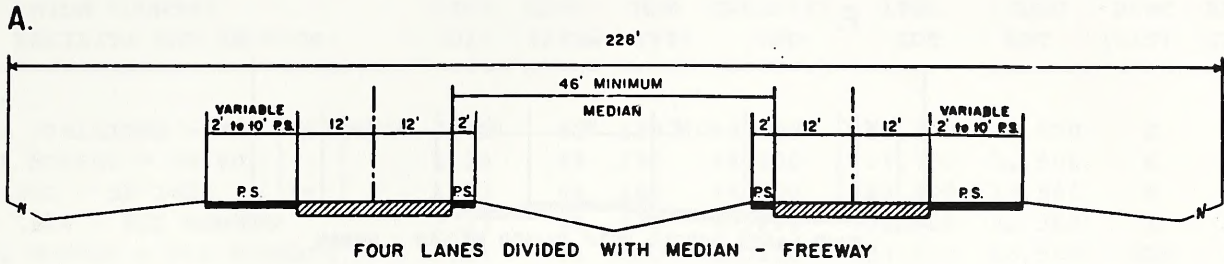
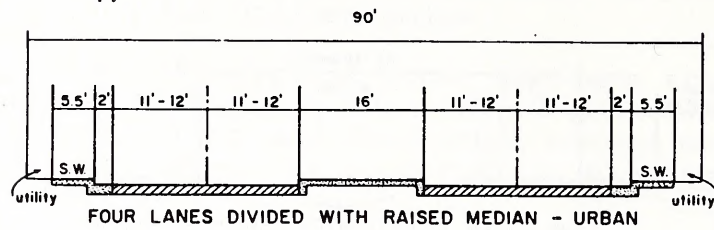


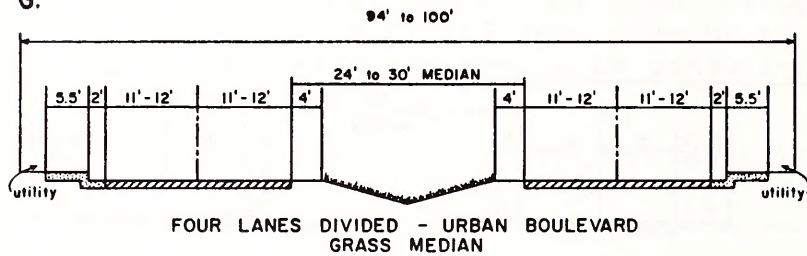
FIGURE A1

TYPICAL THOROUGHFARE CROSS SECTIONS (CONTINUED)

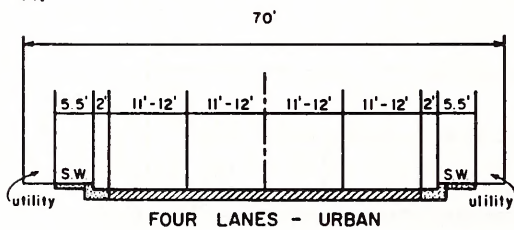
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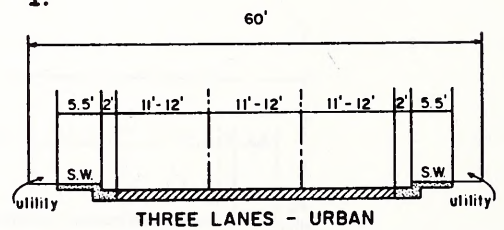
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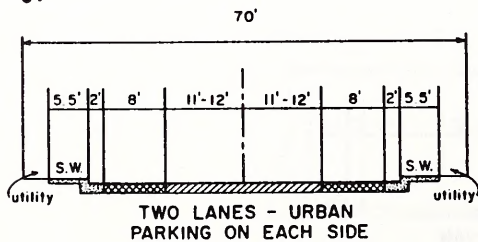
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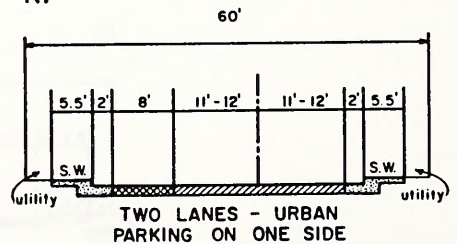
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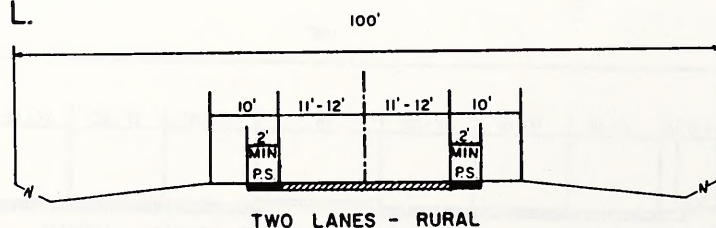


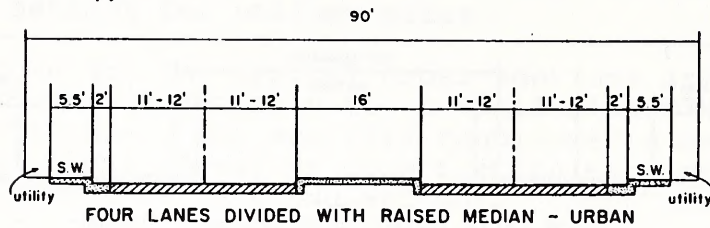
TABLE A-1 THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

UNION COUNTY: FACILITY AND SECTION	EXISTING X-SECTION			CAPACITY VPD	1990 ADT	2020 ADT	REC. X-SEC.		
	DIST (MI)	RDWY (FT)	ROW (FT)				RDWY (ULT)	ROW (ULT)	

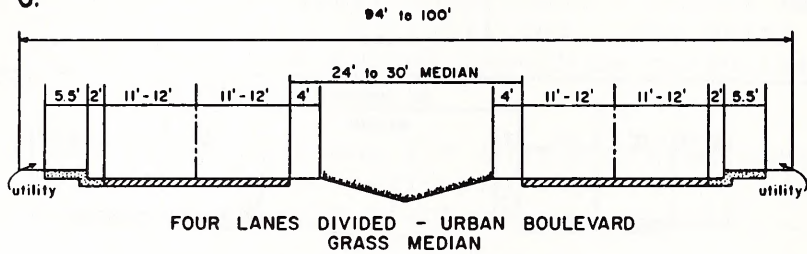
US 74									
ECL STALLINGS - WCL MONROE	7.41	48	170	44,200	32,300	41,600	E	ADQ	
WCL MONROE - US 601	1.34	48	170	44,200	24,700	31,900	E	ADQ	
US 601 - SR 1624	1.23	48	150	44,200	33,900	43,600	E	ADQ	
SR 1624 - ECL MONROE	3.21	48	150	44,200	32,900	42,300	E	ADQ	
ECL MONROE - WCL WINGATE	3.21	48	220	44,200	20,600	26,500	ADQ	ADQ	
WCL WINGATE - ECL WINGATE	1.73	68	220	54,400	19,300	24,800	ADQ	ADQ	
ECL WINGATE - WCL MARSHVILLE	3.01	48	150	44,200	14,600	35,400	ADQ	ADQ	
WCL MARSHVILLE - SR 1734	2.43	68	150	54,400	13,900	33,700	ADQ	ADQ	
SR 1734 - ANSON COUNTY	2.58	48	150	44,200	9,900	24,000	ADQ	ADQ	
US 74									
BYPASS	3.85	--	---	-----	-----	38,000	B	200	
BYPASS EXT.	7.50	--	---	-----	-----	37,000	B	200	
US 601									
CABARRUS COUNTY - NC 218	4.42	24	100	9,000	3,200	8,000	B	200	
NC 218 - NCL MONROE	9.83	24	100	9,000	3,800	9,000	B	200	
NCL MONROE - SR 1623	0.11	44	120	33,000	7,100	17,000	ADQ	ADQ	
SCL MONROE - SR 1005	9.99	24	60	9,000	6,800	16,000	B	200	
SR 1005 - SC LINE	1.80	24	60	9,000	6,300	15,000	B	200	
NC 16									
MECKLENBURG CTY - NC 84	1.04	18	60	6,600	8,000	22,000	B	200	
NC 84 - NCL WAXHAW	6.77	18	60	6,600	4,300	12,000	B	200	
NCL WAXHAW - NC 75	0.43	24	60	9,000	6,400	18,000	H	70	
NC 75									
SC LINE - S BROAD ST/WAXHAW	2.19	24	60	9,000	4,000	7,000	ADQ	ADQ	
S BROAD ST - SR 1109	0.21	40	60	28,800	7,500	13,000	I	ADQ	
SR 1109 - ECL WAXHAW	0.50	24	60	9,000	5,000	9,000	I	ADQ	
ECL WAXHAW - NC 84	9.79	24	60	9,000	6,000	11,000	H	70	
NC 84 - WCL MONROE	0.13	24	60	9,000	8,500	15,000	H	70	
NC 84									
NC 16 - SR 1007	8.70	20	100	7,200	4,000	7,000	L	ADQ	
SR 1007 - NC 75	2.40	20	100	7,200	4,000	7,000	L	ADQ	
NC 200									
STANLY COUNTY - NC 218	3.27	24	100	9,000	1,000	2,000	ADQ	ADQ	
NC 218 - MONROE URBAN BDRY N	9.99	20	100	7,200	5,500	9,000	L	ADQ	
MONROE URBAN BDRY S - NC 522	8.94	20	60	7,200	6,500	11,000	L	100	
NC 522 - SC LINE	8.70	20	60	7,200	3,500	6,000	L	100	
NC 205									
STANLY COUNTY - SR 1006	8.70	18	60	6,600	700	1,000	L	100	
SR 1006 - NCL MARSHVILLE	4.90	20	60	7,200	900	1,500	L	100	
NCL MARSHVILLE - US 74	0.55	24	60	9,000	1,500	2,000	ADQ	ADQ	

TYPICAL THOROUGHFARE CROSS SECTIONS (CONTINUED)

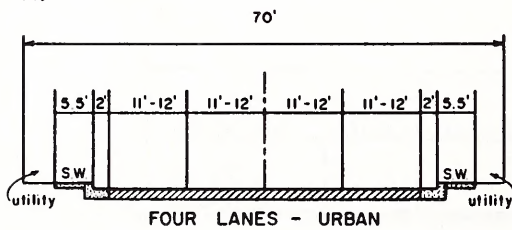
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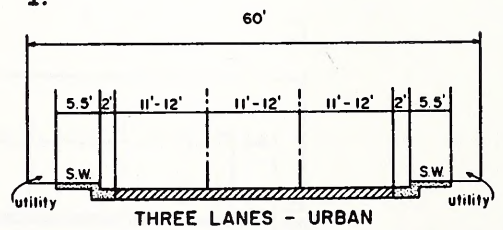
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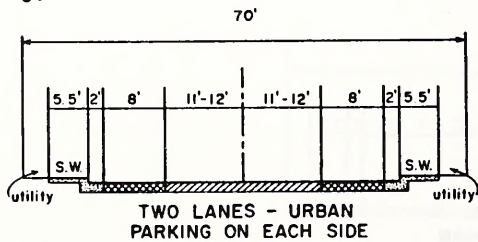
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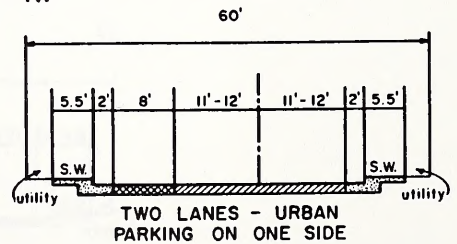
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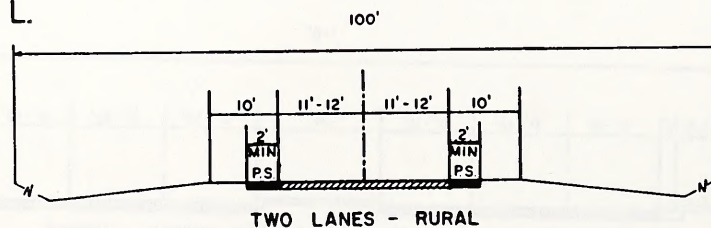


TABLE A-1 THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

UNION COUNTY: FACILITY AND SECTION	EXISTING X-SECTION				REC. X-SEC.			
	DIST (MI)	RDWY (FT)	ROW (FT)	CAPACITY VPD	1990 ADT	2020 ADT	RDWY (ULT)	ROW (ULT)

US 74								
ECL STALLINGS - WCL MONROE	7.41	48	170	44,200	32,300	41,600	E	ADQ
WCL MONROE - US 601	1.34	48	170	44,200	24,700	31,900	E	ADQ
US 601 - SR 1624	1.23	48	150	44,200	33,900	43,600	E	ADQ
SR 1624 - ECL MONROE	3.21	48	150	44,200	32,900	42,300	E	ADQ
ECL MONROE - WCL WINGATE	3.21	48	220	44,200	20,600	26,500	ADQ	ADQ
WCL WINGATE - ECL WINGATE	1.73	68	220	54,400	19,300	24,800	ADQ	ADQ
ECL WINGATE - WCL MARSHVILLE	3.01	48	150	44,200	14,600	35,400	ADQ	ADQ
WCL MARSHVILLE - SR 1734	2.43	68	150	54,400	13,900	33,700	ADQ	ADQ
SR 1734 - ANSON COUNTY	2.58	48	150	44,200	9,900	24,000	ADQ	ADQ
US 74								
BYPASS	3.85	--	----	-----	-----	38,000	B	200
BYPASS EXT.	7.50	--	----	-----	-----	37,000	B	200
US 601								
CABARRUS COUNTY - NC 218	4.42	24	100	9,000	3,200	8,000	B	200
NC 218 - NCL MONROE	9.83	24	100	9,000	3,800	9,000	B	200
NCL MONROE - SR 1623	0.11	44	120	33,000	7,100	17,000	ADQ	ADQ
SCL MONROE - SR 1005	9.99	24	60	9,000	6,800	16,000	B	200
SR 1005 - SC LINE	1.80	24	60	9,000	6,300	15,000	B	200
NC 16								
MECKLENBURG CTY - NC 84	1.04	18	60	6,600	8,000	22,000	B	200
NC 84 - NCL WAXHAW	6.77	18	60	6,600	4,300	12,000	B	200
NCL WAXHAW - NC 75	0.43	24	60	9,000	6,400	18,000	H	70
NC 75								
SC LINE - S BROAD ST/WAXHAW	2.19	24	60	9,000	4,000	7,000	ADQ	ADQ
S BROAD ST - SR 1109	0.21	40	60	28,800	7,500	13,000	I	ADQ
SR 1109 - ECL WAXHAW	0.50	24	60	9,000	5,000	9,000	I	ADQ
ECL WAXHAW - NC 84	9.79	24	60	9,000	6,000	11,000	H	70
NC 84 - WCL MONROE	0.13	24	60	9,000	8,500	15,000	H	70
NC 84								
NC 16 - SR 1007	8.70	20	100	7,200	4,000	7,000	L	ADQ
SR 1007 - NC 75	2.40	20	100	7,200	4,000	7,000	L	ADQ
NC 200								
STANLY COUNTY - NC 218	3.27	24	100	9,000	1,000	2,000	ADQ	ADQ
NC 218 - MONROE URBAN BDRY N	9.99	20	100	7,200	5,500	9,000	L	ADQ
MONROE URBAN BDRY S - NC 522	8.94	20	60	7,200	6,500	11,000	L	100
NC 522 - SC LINE	8.70	20	60	7,200	3,500	6,000	L	100
NC 205								
STANLY COUNTY - SR 1006	8.70	18	60	6,600	700	1,000	L	100
SR 1006 - NCL MARSHVILLE	4.90	20	60	7,200	900	1,500	L	100
NCL MARSHVILLE - US 74	0.55	24	60	9,000	1,500	2,000	ADQ	ADQ

TABLE A-1 THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

UNION COUNTY: FACILITY AND SECTION	EXISTING X-SECTION				1990 ADT	2020 ADT	REC. X-SEC.	
	DIST (MI)	RDWY (FT)	ROW (FT)	CAPACITY VPD			RDWY (ULT)	ROW (ULT)
NC 207								
SC LINE - SCL MONROE	9.35	18	100	6,600	2,500	4,000	L	ADQ
NC 218								
MECKLENBURG CTY - NC 200	6.49	18	100	6,600	3,500	6,000	L	ADQ
NC 200 - NC 205	4.20	18	100	6,600	1,500	2,000	L	ADQ
NC 205 - ANSON CTY	5.90	18	100	6,600	800	1,500	L	ADQ
NC 522								
SC LINE - NC 200	5.80	18	60	6,600	2,500	4,000	L	100
NC 742								
ANSON CTY - STANLY CTY	2.70	18	100	6,600	900	1,500	L	ADQ
SR 1001								
US 601 - SR 1606	4.10	18	60	6,600	2,300	6,000	L	100
SR 1002								
ECL WINGATE - SR 1753	0.17	16	60	6,000	4,000	9,000	L	100
SR 1753 - SR 1751	1.60	20	60	7,200	2,390	6,000	L	100
SR 1751 - SR 1748	3.20	18	60	6,600	984	2,000	L	100
SR 1748 - NC 205	0.20	18	60	6,600	719	2,000	L	100
NC 205 - ANSON COUNTY	5.70	18	60	6,600	579	1,000	L	100
SR 1003								
ANSON COUNTY - SR 1005	1.10	16	60	6,000	302	700	L	100
SR 1005 - SR 1929	2.30	16	60	6,000	302	700	L	100
SR 1929 - SR 1937	2.40	16	60	6,000	302	700	L	100
SR 1937 - SR 1957	5.20	20	60	7,200	2,969	7,000	L	100
SR 1957 - US 601	1.60	20	60	7,200	2,969	7,000	L	100
SR 1004								
MECK CO. - BNTN XROADS	6.20	18	60	6,600	2,227	6,000	L	100
SR 1005								
SC LINE - SR 2102	4.30	18	60	6,600	518	1,000	L	100
SR 2102 - US 601	1.30	18	60	6,600	518	1,000	L	100
US 601 - SR 1003	7.40	18	60	6,600	747	1,500	L	100
SR 1003 - SCL MARSHVILLE	5.58	18	60	6,600	869	1,500	L	100
SCL MARSHVILLE - US 74	0.17	18	60	6,600	869	1,500	L	100
SR 1006								
NC 200 - SR 1758	4.30	22	60	8,200	1,697	4,000	L	100
SR 1758 - SR 1632	2.30	22	60	8,200	1,697	4,000	L	100
SR 1632 - NC 205	2.60	18	60	6,600	1,697	4,000	L	100
NC 205 - NC 218	6.90	18	60	6,600	307	500	L	100

TABLE A-1 THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

UNION COUNTY: FACILITY AND SECTION	EXISTING X-SECTION				REC. X-SEC.			
	DIST (MI)	RDWY (FT)	ROW (FT)	CAPACITY VPD	1990 ADT	2020 ADT	RDWY (ULT)	ROW (ULT)
SR 1007								
US 74 - SR 1009	0.70	24	60	9,000	4,000	11,000	L	100
SR 1009 - NC 200	9.99	20	60	7,200	4,000	9,000	L	100
NC 200 - SC LINE	5.10	18	60	6,600	4,000	9,000	L	100
SR 1008								
NCL WAXHAW - SR 1328	3.40	18	60	6,600	1,261	3,000	L	100
SR 1328 - SCL INDIAN	7.00	18	60	6,600	1,261	3,000	L	100
SCL INDIAN - US 74	1.60	22	60	8,200	7,000	19,000	L	100
SR 1009								
NCL MONROE - ECL STALLINGS	6.42	24	60	9,000	7,631	18,000	D	80
ECL STALLINGS - MECK CO.	2.36	24	60	9,000	9,500	26,000	D	80
SR 1111								
SCL WAXHAW - NC 75	6.00	18	60	6,600	3,200	8,000	L	100
SR 1117								
SC LINE - SR 1111	6.20	18	60	6,600	857	2,000	L	100
SR 1137								
SC LINE - SR 1118	2.70	16	60	6,000	864	2,000	L	100
SR 1118 - NC 200	1.50	20	60	7,200	864	2,000	L	100
SR 1315								
SC LINE - SR 1008	7.60	18	60	6,600	1,700	4,500	L	100
SR 1008 - SR 1007	5.00	18	60	6,600	1,967	4,500	L	100
SR 1367								
SR 1501 - US 601	4.80	18	60	6,600	2,094	4,000	L	100
US 601 - SR 1615	5.06	18	60	6,600	2,094	4,000	L	100
SR 1377								
SR 1162 - SR 1353	1.90	18	60	6,600	3,000	8,500	L	100
SR 1353 - US 74	1.21	20	60	7,200	2,000	5,500	L	100
SR 1501								
NCL MONROE - SR 1367	0.78	18	60	6,600	3,265	9,000	L	100
SR 1367 - SR 1520	4.66	18	60	6,600	2,000	5,500	L	100
SR 1520 - MECK CO.	2.02	22	60	8,200	4,500	12,500	H	70
SR 1514								
US 74 - SR 1004	5.50	20	60	7,200	2,267	6,500	L	100
SR 1606								
STANLY COUNTY - SR 1001	6.10	18	60	6,600	654	1,000	L	100

TABLE A-1 THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS

UNION COUNTY: FACILITY AND SECTION	EXISTING X-SECTION				1990 ADT	2020 ADT	REC. X-SEC.	
	DIST (MI)	RDWY (FT)	ROW (FT)	CAPACITY VPD			RDWY (ULT)	ROW (ULT)
SR 1627 NC 200 - NC 205	9.60	18	60	6,600	900	1,500	L	100
SR 1740 US 74/WINGATE - SR 1754	2.00	36	60	14,600	4,700	11,500	L	100
SR 1751 ECL MONROE - SR 1002	1.10	20	60	7,200	1,014	2,000	L	100
SR 1002 - NC 205	5.30	20	60	7,200	1,014	2,000	L	100
SR 1758 US 74 - SCL WINGATE	0.61	28	60	12,800	4,700	11,000	L	100
SCL WINGATE - SR 1957	1.80	18	60	6,600	4,700	11,000	L	100
SR 1937 SR 1740 - SR 1003	5.40	18	60	6,600	220	400	L	100
SR 1941 US 74 - SR 1003	6.00	18	60	6,600	1,435	3,500	L	100
SR 1957 SR 1003 - SR 1740	3.30	18	60	6,600	242	500	L	100
SR 2102 URBAN BDY - SR 2106	2.64	16	60	6,000	698	1,500	L	100
SR 2106 SR 2102 - SR 2115	1.00	16	60	6,000	514	1,000	L	100
SR 2115 - US 601	1.70	18	60	6,600	700	1,500	L	100
SR 2115 SR 2106 - NC 207	1.60	20	60	7,200	2,411	6,000	L	100
SR 2139 SCL MONROE - NC 200	7.38	18	60	6,600	3,035	6,000	L	100
SR 2146 NC 200 - SC LINE	8.40	18	60	6,600	700	1,500	L	100

Appendix B

DEFINITIONS

I. Streets and Roads:

A. Rural Roads

1. Principal Arterial - A rural link in a highway system serving travel, and having characteristics indicative of substantial state wide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.
2. Minor Arterial - A rural roadway joining cities and larger towns and providing intrastate and inter-county service at relatively high overall travel speeds with minimum interference to through movement.
3. Major Collector - A road which serves major intra-county travel corridors and traffic generators and provides access to the Arterial system.
4. Minor Collector - A road which provides service to small local communities and traffic generators and provides access to the Major Collector system
5. Local Road - A road which serves primarily to provide access to adjacent land, over relatively short distances.

B. Urban Streets

1. Major Thoroughfares - Major thoroughfares consist of Interstate and other freeway, expressway, or parkway roads, and major streets that provide for the quick movement of high volumes of traffic within and through urban areas.
2. Minor Thoroughfares - Minor thoroughfares collect traffic from local access streets and carry it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating minor through-traffic movements and may also serve abutting property.
3. Local Street - A local street is any street not on a higher order urban system and serves primarily to provide direct access to abutting land.

C. Specific Type Rural or Urban Streets

1. Freeway, expressway, or parkway - Divided multilane roadways designed to carry large volumes of traffic at high speeds. A freeway provides for continuous flow of vehicles to selected crossroads only by way of

interchanges. An expressway is a facility with full or partial control of access and generally with grade separations at major intersections. A parkway is for non-commercial traffic, with full or partial control of access.

2. Residential Collector Street - A local street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.
3. Local Residential Street - Cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than one mile in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.
4. Cul-de-sac - A short street having only one end open to traffic and the other end being permanently terminated and a vehicular turn-around provided.
5. Frontage Road - A road that is parallel to a partial or full access controlled facility and provides access to adjacent land.
6. Alley - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

II. Property:

A. Building Setback Line

A line parallel to the street in front of which no structure shall be erected.

B. Easement

A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.

C. Lot

A portion of a subdivision, or any other parcel of land, which is intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

III. Subdivision:

A. Subdivider

Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.

B. Subdivision

All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose immediate or future, of sale or building development and all divisions of land involving the dedication of a new street or change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than ten acres where no street right-of-way dedication is involved; (3) widening of open streets; (4) the division of a tract in single ownership whose entire area is no greater than two acres into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.

C. Dedication

A gift, by the owner, of his property to another party without any consideration being given for the transfer. The dedication is made by written instrument and is completed with an acceptance.

D. Reservation

Reservation of land does not involve any transfer of property rights. It constitutes an obligation to keep property free from development for a stated period of time.

Appendix C

MASS TRANSPORTATION

In general mass transportation provides an alternative to individual travel by automobile. Those served are more likely to be one of the following: non-driving young, elderly, poor, handicapped, or the cost-conscious driver. The goals and good qualities that mass transportation attempts to offer are reductions in congestion, pollution, fuel consumption, parking, requirements, and highway maintenance and expansion. However these benefits are significant only if mass transportation diverts large numbers of auto users from the existing system. This is generally not the case because users from the existing system tend to prefer the attractiveness and flexibility offered by the private automobile.

Mass transportation usually follows a natural progression from cars, to car-pools, to van-pools, to buses, and then to rapid rail transit. These forms of transportation are driven by four criteria: 1) dwelling unit density, 2) funding -capital outlay, maintenance, and operating costs, 3) population density, and 4) employment density. Table C1 shows the minimum dwelling unit densities for several transit modes.

The population of Union County and its communities is low density and still follows a primarily rural pattern. Presently the population density of the County is 131.41 persons per square mile. Dwelling unit densities have increased in the past decades with 0.04 du/a in 1970, 0.06 du/a in 1980, and 0.07 du/a in 1990 (du/a = dwelling units per acre). Tables C2 and C3 show the criteria and requirements for bus and light rail transit. Though, present travel patterns show an increase in trips between suburbs; with gasoline relatively cheap, people will continue to use their cars over mass transportation for convenience sake. Trips in private automobiles provide flexibility, shorter travel times, and the monetary cost of implementing a mass transportation system is significant and long lasting. These factors support the conclusion that the demand for mass transportation, in Union County, would be too low to support buses or light rail. However car-pooling, van-pooling, or using HOV lanes could be worth consideration.

To establish van-pooling one could contact the City of Charlotte Transportation Alternatives. To start car-pooling the towns might serve as an information hub to help match commuters for their ridesharing. Promotions of these two transportation modes would primarily be based on cost savings to the commuters.

In the future if the commuter population traveling from Union County to Mecklenburg County (i.e. the US 74 corridor between Monroe and the Mecklenburg county line) continues to increase then high occupancy vehicle, HOV, lanes may be a consideration. A HOV lane is one designated solely for buses, car-pools, and van-pools. Generally an HOV lane becomes a viable alternative in high density urban areas like Los Angeles, Pittsburgh, and New York City.

A final question must be asked before successful new transportation operations could be implemented. **Is the population in general dissatisfied with their current transportation options and facilities?**

TABLE C1

TRANSIT MODES RELATIVE TO RESIDENTIAL DENSITY		
MODE	SERVICE	MINIMUM DENSITY
Dial-a-bus	Many origins to many destinations	6 dwelling units/ac.
Dial-a-bus	Fixed destination or subscription service	3.5 - 5 dwelling units/ac
Local bus	Minimum, 1/2 mile route spacing, 20 buses/day	4 dwelling units/ac.
Local bus	Intermediate, 1/2 mile route spacing, 40 buses/day	7 dwelling units/ac.
Local bus	Frequent, 1/2 mile route spacing, 120 buses/day	15 dwelling units/ac.
Express bus reached on foot	5 buses during two peak hour periods	avg. 15 dwelling units/2 sq. mi. area
Express bus reached by auto	5-10 buses during two peak hour periods	avg. 3 dwelling units/20 sq. mi. area
Light rail	5 minute headways or better during peak hour	avg. 9 dwelling units/25-100 sq. mi. area
Rapid transit	5 minute headways or better during peak hour	avg. 12 dwelling units/100- 150 sq. mi. area
Commuter rail	20 trains a day	1-2 dwelling units/ac.

TABLE C2

BUSES	
CRITERIA	REQUIREMENT
1. Minimum urban area population	25,000 - 50,000
2. Minimum CBD employment	approximately 10,000
3. User characteristics	mode-dependent, blue collar, low income, elderly, and students
4. Route length, typical	under 5 miles
5. Route characteristics	good street system, land use controls
6. Trip characteristics	only 20-30% are work trips

From - Transportation Research Board; "Bus Use of Highways"

TABLE C3

LIGHT RAIL TRANSIT	
CRITERIA	REQUIREMENT
1. Urban population	2,000,000
2. Minimum CBD employment	700,000
3. CBD function	Regional
4. CBD floor space	50,000,000 sq. ft.
5. CBD employment	100,000

From - Transportation Research Board; "Bus Use of Highways"

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